IRON AGE

editorial

The Age of Folly

THE next few weeks should be an inventory period for those in charge of our government and our defense. What turns up might be of aid to the enemy. It might also be good for our souls. Anything good for our souls ought to be bad for our enemy.

We are in the midst of a defense program. The orders are coming in but they are coming in hit or miss. There is no overall comprehensive military plan to help business to give its best. Maybe it will come in time but will that be time enough?

Our No. 2 enemy is inflation. It can wreck us as surely as an all out war. It is getting away from those whose duty it is to keep it in check.

We hear talk of controls. We control the tail and let the dog go where he will. We clamp on ceilings—voluntary—knowing full well they won't work. We talk big stuff when the staff to run such a serious program as price and wage controls is hardly large enough to take a letter.

We put people in jobs of top responsibility whose sole qualification for the job is getting along with others. We have one excellent appointment at the top. He will need all the miracles in the Bible to get our defense and mobilization going in time to mean something.

We talk of a big army when our law and statistics show we can't even hit that goal anywhere near the time set—unless Congress changes the law. We don't have all the time in the world.

We have had more than 6 months—or 5 years—for the military to find out what kind of a war they should prepare for. If they don't know, who does? If they can't get on paper what we need, who can? If they lack leadership of the kind that moves forward with decision, what can we expect of the people who look to them and to others in Washington?

On the home front we hear about sacrifice. Aside from the real sacrifices of families and friends of casualties, where has there been any hardship in this country since the Civil War? Aside from these, what was really sacrificed in World War I or World War II? What will we give up this time? Ice cream, or shall we have it only on Sunday?

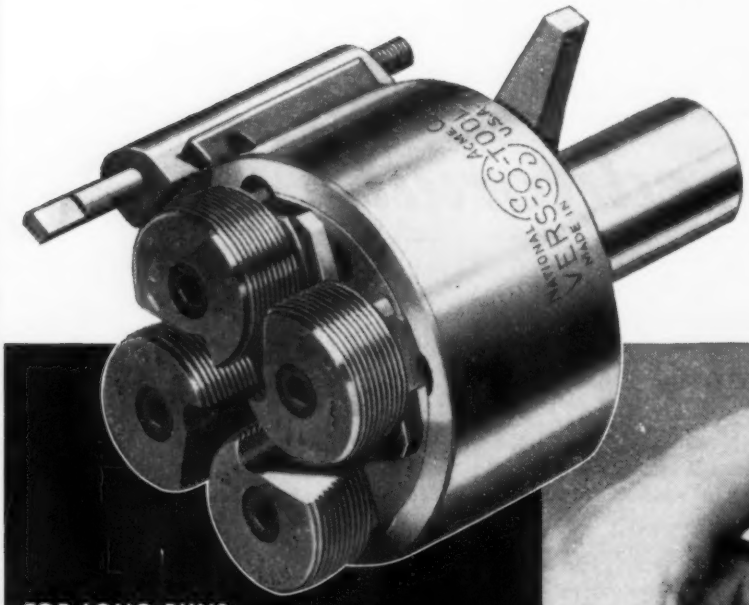
Let Washington not prate about sacrifice, or the home front take credit for walking instead of riding to the corner store. We are in for a Spartan existence unknown to us, before we can again earn the label of the best, the strongest and the freest people.

Tom Campbell

Editor

GET THESE TIME-PROVED

for the Tops in Threading Performance



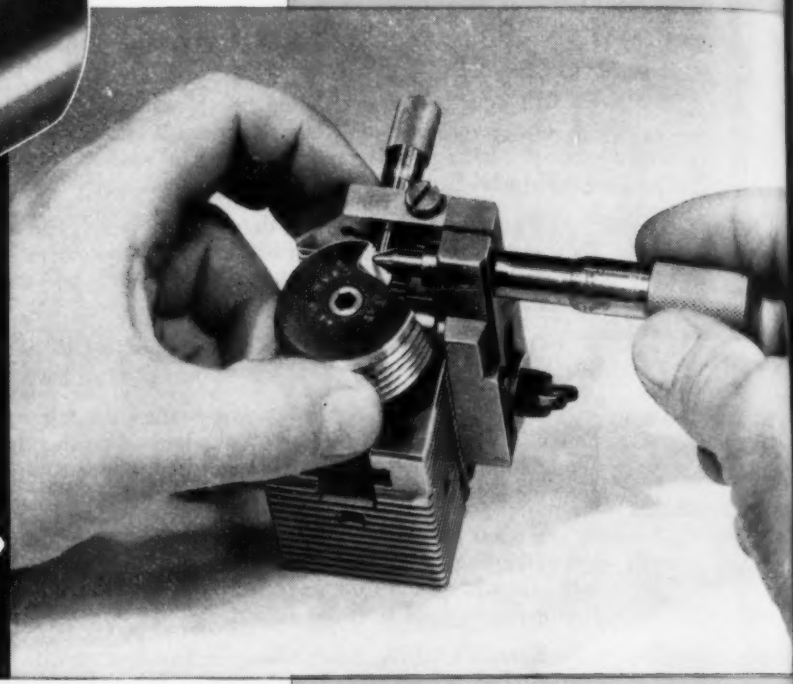
THEY'RE
– LIGHT-WEIGHT
– BALANCED
– PRECISION-BUILT

FOR LONG RUNS

with Long-Life Circular Chasers

Head Sizes: Straight Threads 1/4" to 9/16"
Pipe Threads 1/8" and 1/4"

The famous Namco Double Barrel Micrometer Gauge insures identical check on uniformity of all chaser cutting edges, whether you use circular or adjustable blade chasers.



BOTH USE GROUND-THREAD PRECISION CHASERS

- Namco Vers-O-Tool Circular Chasers are regrindable through a full 270°—and Vers-O-Tool Adjustable Blade Chasers are designed to give more regrinds than conventional types, with the blade adjustable to proper cutting position for any type of material.
- One micrometer gauge serves both circular and adjustable types. A minimum adjustment of .008″ for economical regrinds insures a freshly ground chaser always at correct cutting position.
- Vers-O-Tool Heads, too, are hardened and ground throughout.
- Quick removal and replacement of chasers or blocks is made by loosening only two screws.
- Vers-O-Tool Heads are provided with radial adjustment for wear on all sizes. Diametric adjustment is made by one screw. Both adjustments take less than two minutes.

YOU CAN

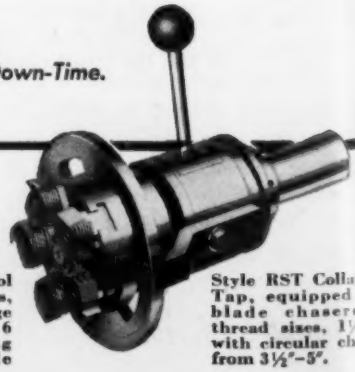
For close-to-shoulder short or long threads, use either Circular or Adjustable Blade Chasers.

For straight turning, use Circular or Adjustable Cutters.

Vers-O-Tools Give You More Threads per Dollar, with Closer Tolerances and Less Threading Down-Time.

Style DS Vers-O-Tool (Non-Revolving Type), 8 sizes, 3/16"–4 1/8" cutting range.

Style DR Vers-O-Tool (Revolving Type), 12 sizes, .056"–4 7/8" cutting range with circular chasers; 6 sizes, 3/16"–1 1/2" cutting range with adjustable blade chasers.



Style RST Collapsible Tap, equipped with blade chasers for thread sizes, 1 1/4"–4" with circular chasers, from 3 1/2"–5".

IRON AGE *summary*

iron and steel industry trends

Sweeping Changes in Steel Priorities
New Programs Coming, Others Reduced
Higher Limits on DO Quotas Expected

SWEEPING changes in steel priorities will result from new rules and regulations now being worked out by government and industry representatives. DO priority orders will be lifted out of the strict military category and given wider application. In addition, big increases in the tonnage allocated to DO and essential civilian programs will be felt soon.

Broadened DO applications will include such items as construction of new plants, steel mill expansion, construction of facilities to safeguard public health and safety, and other projects approved by NPA.

Additional allocation programs already in the cards call for 1.9 million tons of steel in the form of oil country goods for the petroleum industry. Other needs of the petroleum industry have not yet been settled. Another program will be needed to provide steel for up to 40 merchant ships.

Other Programs Due for Cutbacks

Two other programs will probably have their quotas shaved during the second quarter. Freight car builders are expected to be cutback from 308,000 to 288,000 tons per month. And allocations for a diesel locomotive program starting in April, will probably be somewhat lower than the original estimate of 70,000 tons per month.

Effective Mar. 1 (DO limits), on various steel products will be raised. Probable new percentages are: Stainless steels, semi - finished alloys, hot-rolled alloys, 35 pct; cold-finished alloy bars, 25 pct; carbon steel structurals, 20 pct; sheet piling, reinforcing bars, and cold-finished carbon bars, 15 pct; hot- and cold-rolled sheets, 12 pct; hot-rolled carbon bars, hot- and cold-rolled strip, wire rods, and rail steel bars, 10 pct; and tin mill products, 5 pct.

Although all steel items are in very tight supply, alloy steel demand is surging and boiling this week. A big chunk of alloy output is now going to the growing defense program. One stainless and alloy producer reports that 28½ pct of its orders are going for defense use. This percentage will increase in the next few months. The tank program alone is expected to take 100,000 tons of alloy steel within a 6 to 9 month period.

Bars Are Tighter Than Sheets

In the auto industry the tight market for flat-rolled steel has now been overmatched by the growing scarcity of carbon and alloy hot-rolled bars, ton for ton—despite the fact that bars cost less than sheets.

This week there is a marked increase in the number of government directives to steel producers. Most of these directives are spot requests for more DO tonnage. They are needed to expedite vital programs which cannot wait for steel through regular DO channels. Such directives are causing steel people to book DO tonnage beyond specified limits.

In order to meet quotas assigned to them, some mills have been forced to revise production schedules to the point where operations and profits have been affected. In some cases producers find that they must make products which they do not normally offer for sale.

Need Steel for Own Expansion

Steel producers are finding it hard to get steel for their own expansion programs. One company tried to work out a conversion deal with another producer for heavy structurals, but the plan was dropped because loss of the ingots involved would have hurt the mill's own rolling schedules.

Steelmaking operations this week are scheduled at 99.5 pct of rated capacity, up ½ point from last week's revised rate. This is based on new annual capacity of 104,229,650 net tons as of Jan. 1, 1951.

(nonferrous summary, p. 96)

"We have found GRAPH-MO an ideal steel for these cavity molds . . ."

REPORTS THE PARKER APPLIANCE CO.

SYNTHETIC rubber O-rings manufactured by The Parker Appliance Company, Cleveland, Ohio, are molded to extremely close tolerances and high finishes. To insure these qualities, the molds must be exact duplicates in dimension and finish. Parker formerly used various tool steels and boiler plate to make the molds, but found these steels hard to machine. And because they lacked stability after hardening, the molds did not always meet tolerance specifications.

Then they tried Graph-Mo—one of four Timken® graphitic tool steels. And Graph-Mo proved to be the answer. Parker Appliance reports, "We have found Graph-Mo an ideal steel for these cavity molds because it is free machining, holds a high polish and is dimensionally stable after hardening."

Graph-Mo is a special, oil-hardening graphitic tool steel. Because it contains free graphite, it can be machined faster and easier than other oil-hardening steels. Graph-Mo also offers unusual resistance to wear and abrasion, with less tendency to scuff or score.

Graph-Mo is one of four Timken graphitic tool steels. For further information, write for the new Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

Wean-Hallden
LOW COST SYNCHRONIZED AUTOMATIC SHEAR LINES

THE installation of a Wean-Hallden Synchronized Automatic Shear Line assures you the most efficient shearing operation available today. The Wean-Hallden, while actually requiring *less floor space*, delivers up to *twice the production*. Infinite variable lengths from 12-inches to 12-feet at speeds up to 200 FPM with accuracy better than commercial tolerances means faster production, reduced labor costs and minimum scrap loss for you. *Before You Buy—Investigate Wean-Hallden.*

Wean *Equipment Corporation*
CLEVELAND, OHIO

Dear EDITOR

Letters from Readers

Universal Question

Sir:

We would like some honest answers to the questions we are going to ask in this letter; we are sure your staff is in a position to help us get on the right road in these tangled times. Our facilities are above average for a small sheet metal plant. During the past war I was employed by the local division of Consolidated-Vultee Aircraft Corp., as General Foreman of the Sheet Metal Dept. That gives me some of the know-how regarding the volume production of sheet metal parts, as well as dealing with 800 people and their union representatives.

Our normal line of business has been the manufacture and erection of air conditioning duct work, also the manufacture to customer specifications of various job lot items such as lockers, cabinets, baskets and prefabricated duct work. Now for the questions, in case you have not guessed: "What, where and how in your opinion can we best serve in the defense effort?

W. ESSNER
Essner Metal Works
Fort Worth, Tex.

How to best serve the defense effort is a question being asked by companies all the way up the line to the biggest in the country, and as yet there doesn't seem to be any clear cut answer. Henry Ford II stated the other day that the Ford Motor Co. had not yet been given a clear picture as to what it was expected to do. The best guide we can give at the present time is to refer to the article "How To Sell To Uncle Sam" on p. 269 of the Jan. 4 Annual Review Issue of THE IRON AGE, and to p. 371 for the list of major metal products bought by the Armed Forces and where they are bought. —Ed.

Varied Reactions

Sir:

As a former assistant in a public library, and now the Librarian of an engineering research library in industry, I consider THE IRON AGE an old friend. I've been a reader of "Fatigue Cracks" from "Dix to Post," and quite naturally turned to that column for possible explanation of our f.f.j.'s "new look" in its Dec. 21, 1950, issue, learning that we are now to have IRON AGE with an aesthetic touch!

Lower-case type has had its day in pulps and slicks so it may as well have a try at the technical magazines, I suppose I can accept it, together with the dotted "i" and other artistic touches on the cover as long as it remains recognizable to our engineers and does not look like a changeling beside its sister issues on our library shelves. You see, magazines which change their size and shape, and even their lettering without due regard for uniformity of appearance when said magazine is shelved or bound, are the despair of librarians.

(Mrs.) O. K. NESBITT
Librarian
Lord Mfg. Co.
Erie, Pa.

Sir:

Some months ago, you changed the arrangement of THE IRON AGE, and I, personally, wish you had not. Having been a reader of your excellent magazine for many years, I feel entitled to at least express an opinion.

I do not like the new arrangement for the reason that I frequently refer to THE IRON AGE for price information and thoroughly dislike having to thumb over innumerable pages of advertising to find what I want. I do think the readers should be privileged to read the ads when desirous and pass them when not interested, and not, when trying to find information, have to thumb through a maze of advertising to obtain the information wanted.

T. O. HOLLAND
Mgr. of Purchases
Ames Baldwin Wyoming Co.
Parkersburg, W. Va.

We have had the same problem ourselves. If we want to refer quickly to specific price pages we first look them up on the contents page. It was to solve just such dilemma that we moved the contents to p. 2 for quick reference.—Ed.

Sir:

I appreciate reading THE IRON AGE. The readability is improving right along, and we find many facts we can use in our daily and weekly contacts with our supervisors.

The editorials by Tom C. Campbell on current topics are timely, and to the point. We enjoy and profit by reading them. I usually send them to our key men.

L. F. REINARTZ
Assistant Vice-President
Armco Steel Corp.
Middletown, Ohio

Sir:

Thought you'd like to know that quite a few here, many of whom know good typographical design and layout when they see it, were much impressed with your December 21st issue. In addition, they found chas. t. post's reference to it in "fatigue cracks" most interesting.

Of course we liked the new layout, also, but we haven't the background of these other people. We suspect that quite a number of your readers are going to say nice things about this new set-up.

H. J. MALLIA
Apparatus News Bureau
General Electric Co.
Schenectady

"no more GAMBLING on tool steel selection"

[⅓ actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Crucible Steel Company of America
Dept. I, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name_____ **Title**_____

Company_____

Street_____

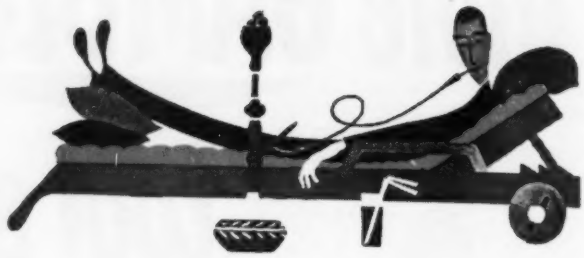
City_____ **State**_____

CRUCIBLE first name in special purpose steels

TOOL STEELS

fifty years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.



Fatigue Cracks

by Charles T. Post

Twenty Digits

Your f.f.j.'s Bill Czygan, who is responsible for the articles on minerals for Funk & Wagnall's *New International Year Book*, had quite a time rounding up last minute 1950 statistics for the new edition. He used the long distance telephone freely, but the telephone strike threw a partial crimp in the operation. The substitute operators were helpful, but as Bill listened for his connection with an official who could give him the statistics on antimony, he heard this dialogue between his man's secretary and the operator.

"Mr. ——— is not in his office, but possibly some one else can help Mr. Czygan. What information does he want?"

After a short consultation, the operator reported back. "I think he wants a doctor, dearie. He says it's about statistical anatomy."

Jet Saucepans

For a while it looked like the titanium situation was going to be tough, with the Cinderella metal being used only for the most vital military items, such as jet engines. But from a news item in *Advertising Age* magazine, it appears that titanium may take the place held by plastics in the last war when the steel and aluminum situation got real tough. Says *Advertising Age:*

> "Federal Enameling and Stamping Co., McKees Rocks, Pa., has opened its most intensive advertising and promotion drive for its line of Vogue enameled kitchen utensils made with titanium."

When you walk into the kitchen, watch out for those flying saucepans!

New Scrap Source

According to U. S. Steel, "A century ago, workmen digging iron ore in a bog in central Virginia came across a deer's skeleton, still intact, that had turned to iron from long immersion in iron-bearing waters." That should give Armour and Swift the necessary know-how to go into the scrap business if they put a price ceiling on meat.

Puzzlers

By J. A. Crites

Many readers have been disturbed by the Dec. 28th puzzle. It seems that in walking for 45 min the man covers the same distance the car would have travelled in 15 min. Perhaps we should have pointed out that our commuter comes into Grand Central Station. It would then have been clear that the 12 mph averaged by the car was remarkable indeed. In spite of the confusion M. E. McKinney, International Harvester Co.; T. W. White and David Lieberman, Ther Electric & Machine Works, and Chas. G. Heilman, Commonwealth Industries Inc., all came through with the right answer.

After setting up several unsolvable equations, light finally dawned and we arrived at an answer of 15 in. for the diameter of the circle in last week's trick puzzle. Hope we are right for a change.

C. E. Norton, National Malleable & Steel Castings Co., poses this one: A boy tosses a ball straight up into the air and catches it when it returns. It goes up in 1 sec and returns in 1.2 sec. Taking g as 32.156 ft/sec^2, and assuming that the air resistance is directly proportional to the square of the velocity, find:

(1) The velocity of the ball when it leaves the boy's hand.

(2) The height to which it travels.

(3) The velocity of the ball when the boy catches it.

machine tool high spots

sales inquiries and production

by W. A. Lloyd

Priority Stage Set—Last week's meeting of machine tool industry representatives and the machinery division of NPA has seemingly set the stage for some concrete action by the government. As of now, there is no definite promise of a blanket priority for materials, but it appears that there is a program headed in that direction.

NPA has photostated copies of the order boards and a study is presumably being made to determine what will be involved in the granting of a blanket priority and a possible expansion of the industry.

Too Small for Volume—The armed services and their major contractors are aware that the industry is too small for the business volume reportedly on the way, a matter of $1 billion, or possibly more, in addition to what is already on the books. In short, the industry will probably get 3 years' business at the present rate of shipments within the near future.

This means drastic action, including sub-contracting, probably on broader scale than in World War II, more manpower, utilization of all plant capacity, including warehouse space in some cases, and some plant expansion. A month ago, there were seven applications for certificates of necessity on file by machine tool builders.

Release Tentative Schedules—Under consideration, but considered likely by industry sources, is a release on part of the tentative production schedules, perhaps 40 pct of the present backlogs. It is believed that General Services Administration will handle the contracts with the industry, and the total is likely to be held to an aggregate of $750 million for metal cutting and forming machines.

The industry will do well to make shipments of $600 million this year, twice the 1950 volume. New order volume in December reportedly increased 15 to 20 pct over November, to a new postwar high and shipments increased about 20 pct over the preceding month. Based on the present index, December shipments were at the $40 million level.

Vanished Complacency—Despite the somewhat indefinite nature of the week's developments, it appears that complacency in Washington regarding the machine tool industry is practically over. It is believed that action will be taken on the blanket priority within a few weeks. Granting of such a priority plus certificates of necessity will put the contemplated expansion plans in high gear.

Efforts are being made to get contracts to obtain ratings for some of the unrated orders they have placed. In addition, the conversion of plants to defense production will speed the rating process.

DO Ratings—NPA authorized use of DO ratings carried by defense orders to procure accessories for production equipment for companies working on rated orders. Ratings may be used for procuring jigs, dies, tools and fixtures where inability to obtain these production equipment accessories would result in failure to meet delivery dates.

Ratings may be used for accessories only if they are needed directly for the production of material for which a rating has been assigned. NPA said the action was taken as a means of granting some temporary assistance immediately, pending a long term program.

Abrasives Conference—In Washington, NPA officials and the abrasives industry advisory committee met to discuss the need for increased production of abrasives for the defense program. Industry spokesmen said they are now operating at nearly full capacity, turning out about as much abrasives as during the peak of World War II.

DATES *to remember*

Jan. 18-20—Society of Plastics Engineers, annual national technical conference, Statler Hotel, New York. Society president is J. H. DuBois, 160 Colt St., Irvington, N. J.

Jan. 19—Malleable Founders Society, semiannual meeting, Hotel Cleveland, Cleveland. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

Jan. 21-23—Truck Trailer Manufacturers Assn., annual convention, Edgewater Gulf Hotel, Edgewater Park, Miss. Association headquarters are in the National Press Bldg., Washington.

Jan. 22-23—Compressed Gas Assn., annual convention, Waldorf Astoria Hotel, New York. Association headquarters are at 11 W. 42nd St., New York.

Jan. 24-25—Caster & Floor Truck Manufacturers Assn., winter meeting, Hotel New Yorker, New York. Association headquarters are at 7 W. Madison St., Chicago.

Jan. 28-Feb. 1 — Associated Equipment Distributors, annual meeting, Stevens Hotel, Chicago. Association headquarters are at 360 N. Michigan Ave., Chicago.

Feb. 19-22—American Institute of Mining & Metallurgical Engineers, annual meeting, Jefferson Hotel, St. Louis. Institute headquarters are at 29 W. 39th St., New York.

Mar. 5-7—Hydraulic Institute, quarterly meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Calif. Institute headquarters are at 122 E. 42nd St., New York.

Mar. 5-7—Manufacturers Standardization Society of the Valve and Fittings Industry, annual meeting, Commodore Hotel, New York. Society headquarters are at 420 Lexington Ave., New York.

Mar. 5-7—Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, William Penn Hotel, Pittsburgh. American Chemical Society national headquarters are at 1155 16th St., Washington.

Mar. 5-9—American Society for Testing Materials, spring meeting, Cincinnati. Society headquarters are at 1916 Race St., Philadelphia.

Mar. 6-8—Society of Automotive Engineers, passenger car, body and materials meetings, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

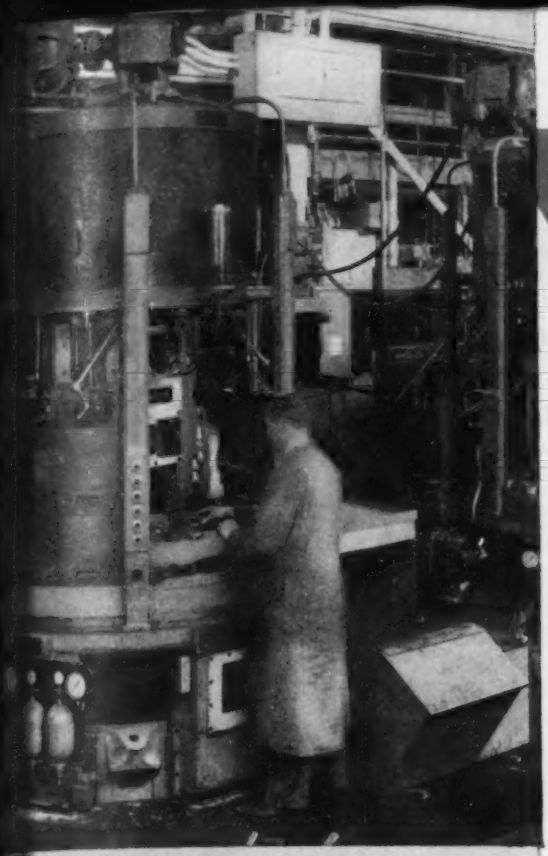
Mar. 12-15—National Electrcal Manufacturers Assn., spring meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Mar. 13-15—Assn. of American Railroads, Engineering Div. and Construction & Maintenance Section, annual meeting. Palmer House, Chicago. Association headquarters are in the Transportation Bldg., Washington.

Mar. 13-16—National Assn. of Corrosion Engineers, conference and exhibition. Statler Hotel, New York. Association headquarters are in the Southern Standard Bldg., Houston.

Mar. 14-17—American Society of Tool Engineers, annual meeting, Hotel New Yorker, New York. Society headquarters are at 10700 Puritan Ave., Detroit.

Mar. 19-21—National Assn. of Waste Material Dealers, annual convention, Stevens Hotel, Chicago. Association headquarters are at 1109 Times Bldg., New York.



"K" 6 STATION 12-SPINDLE MULT-AU-MATIC

83%

INCREASE In Production

Type "K" Mult-Au-Matic 550 Pcs

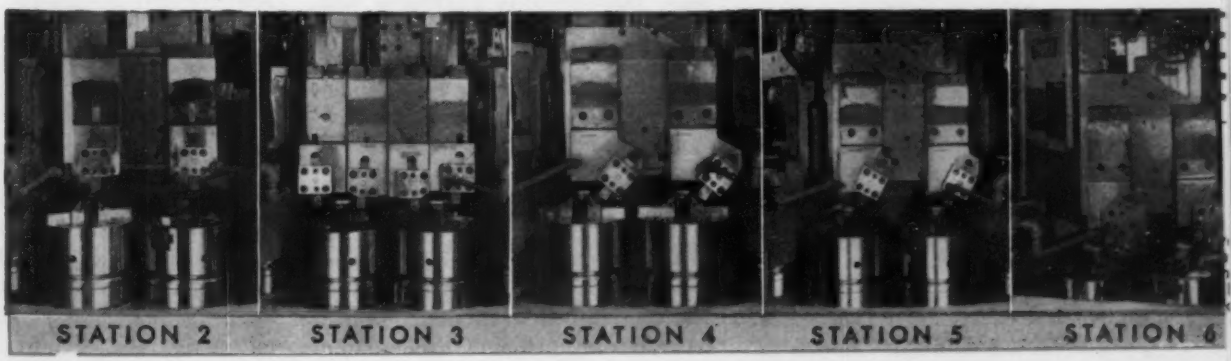
Type "D" Mult-Au-Matic 300 Pcs

A QUOTATION FROM THE FIELD:

We were especially impressed on this job with the ease in which the operator was able to load and unload this machine at the rate of 550 pcs. per hour compared with the operator on the 8 spindle double index Type "D" Mult-Au-Matic on the same operation, who was busy trying to produce 300 per hour."

Twin spindles and twin tooling at each station, and each station with its succeeding operations, provides a progressive, high efficient Production Method on Differential Side Gears.

Ask for information on Type "K" Mult-Au-Matic application to your work.



STATION 2 | STATION 3 | STATION 4 | STATION 5 | STATION 6

...ement in design, higher spindle speeds, faster index and in many cases an improved method for 1st and ... chucking on the same machine are only some of the factors that place the Type "K" Mult-AU-Matic in a ... by itself for Productive Economies.

...E BULLARD COMPANY BRIDGEPORT 2, CONNECTICUT

FREE *publications*

These publications describe money-saving equipment and services . . . they are free with no obligation . . . fill in and mail postcard.

Powdered Metal Parts

A revised catalog details powdered metal fabrication possibilities for various types of parts such as gears, bearings, filters, cams and electronic cores. Principle feature of the revised booklet is a supplement cataloging the company's new line of standard gears and self-lubricating bearings. *Powdered Metal Products Corp.*

For free copy insert No. 1 on postcard.

Surface Grinders

Mattison (Hanchett type) vertical spindle production surface grinders, for the accurate generation of flat surfaces, are described in a new 10-p. bulletin. Detailed descriptions of four models, differing chiefly in productive capacity, are presented, and the various features of the equipment are discussed. Photos show installations performing a variety of jobs, and complete specifications are listed. A section of the booklet deals with magnetic and special chucks, and laminated top plates. *Mattison Machine Works.*

For free copy insert No. 2 on postcard.

Lower Cleaning Costs

A new 8-p. bulletin entitled "Continuous Blast Cleaning Can Reduce Your Cleaning Costs" illustrates and explains the advantages offered by continuous airless abrasive blast cleaning and cites actual production figures for the five sizes of Wheelabrator Continuous Tumblasts. Operation of the units is shown, and examples of production records set are detailed. Models in a range of sizes to meet practically any cleaning problem are illustrated. *American Wheelabrator and Equipment Corp.*

For free copy insert No. 3 on postcard.

Electronics in Welding

How greater versatility, improved weld quality, balanced load, high power factor and 75 pct current reduction may be achieved in resistance welding is explained in a new 4-p. folder on Sciaky patented three-phase machines. The bulletin shows how the three-phase welding system embodying electronic principles operates; it lists representative examples of typical machine specifications and outlines the advantages of direct current at the welding electrodes. *Sciaky Bros., Inc.*

For free copy insert No. 4 on postcard.

Thermosetting Resins

Outstanding properties of Araldite triple-function resins for bonding, casting, and coating in product development are detailed in a new 6-p. folder. The bulletin contains a chart suggesting a wide range of applications for seven types of the material, and photos illustrate a few of the many varied uses of these ethoxyline resins. The material is shown to possess high resistance to corrosion and have adhesive properties toward metals, ceramics and other materials, in addition to high alkali and acid resistance. *Ciba Co., Inc.*

For free copy insert No. 5 on postcard.

Portable Electric Tools

A complete line of 360-cycle and 180-cycle portable electric tools is featured in a new catalog. Drills, screwdrivers, grinders, sanders and polishers are illustrated and described, and complete specifications on every tool are included. *Buckeye Tools Corp.*

For free copy insert No. 6 on postcard.

Maintenance Chart

Of interest to every plant and building maintenance superintendent is the brand new "Maintenance Checking Chart." This complete chart lists many common building maintenance problems and recommends a solution for each. The chart lists over 100 products and processes for maintenance of floors, roofs, interior and exterior walls, waterproofing, special paints and other items. *United Laboratories, Inc.*

For free copy insert No. 7 on postcard.

Heat Treat Bulletin

Designed to present current technical and operating information on heat treating metallurgy and practice, a new bulletin entitled the "Heat Treat Review" is for distribution to all persons concerned with heat treating operations. The magazine is intended to provide up-to-date information on heat treating processes as applied to all phases of the metal-working field. Metal melting and related metal processing activities are also covered. Industrial metallurgists and heat treaters are offered this magazine on a gratis basis by writing on their letterhead to this column. *Surface Combustion Corp.*

For free copy insert No. 8 on postcard.

Slide Chart on Stainless

Technical data and information on workability of stainless steels is presented on a new slide chart. The chart includes a standard analysis table of stainless steels and gives relative fabricating data for a variety of operations. These include soldering, welding, roll forming, hot and cold riveting, forging, buffing, deep drawing.

Turn to Page 90

NEW *production ideas*

new and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard.

Taper Die Sinking Cutters

Have finish-ground ball nose, right-hand cut, straight shanks.

Taper die sinking cutters with full-cutting ball nose are supplied ready to use with ball nose finish-ground to cut to dead center; no preliminary hand grinding is necessary. Two styles of fluting are available: straight, for easy hand sharpening; and spiral for users who prefer helical cutting characteristics and have mechanical grinding equipment. Cutters have a 7° taper (14° included angle). *Pratt & Whitney, Div. Niles-Bement-Pond Co.*

For more data insert No. 18 on postcard.

Melting Furnace

Melts 25 lb lead in 4½ minutes, is adjustable to maintain temperatures.

A new L-P melting furnace, No. 500, constructed of steel and cast iron, burns 15 hr full blast or with intermittent melts; with a sustaining flame it burns up to 60 hr. It can be used with any standard liquid petroleum tank, no gas regulator required. A remote fuel service can be used; the L-P tank can be located any distance from the furnace. *Weldit, Inc.*

For more data insert No. 19 on postcard.

Magnetized Level

Combines level and angle indicator; sticks to round or flat surfaces.

The Magno-Level equipped with powerful Alnico permanent magnets sticks to round or flat surfaces at any angle, leaving hands free for line-up, straightening or fastening work in place. It has a clock-faced angle gage with balanced gravity needle, which determines any angle from 0 to 360°. The level comes in mechanics' pocket-size, 9x2 in., weighs 10 oz. *Buckeye Plastic Corp.*

For more data insert No. 20 on postcard.

Synchronous Generators

Available in four basic designs with ratings from 1.875 to 50 kva.

Designated as Types ATI, ASI, and ATB, new Tri-Clad high-speed synchronous generators have frequency ratings of 60 and 400 cycles. Three standard types of 60 cycle generators are offered, providing a range of characteristics for several different categories of voltage regulation and motor starting requirements. Variations of the basic machines are available with special characteristics for special applications. *General Electric Co.*

For more data insert No. 21 on postcard.

Diamond Abrasive Belts

Diamond impregnated solid nylon; for use on carbide dies, ¼ to 9 in. ID.

New diamond abrasive belts are made of solid nylon impregnated with diamond abrasive in grades of 1-5 microns to a sieve or mesh size of 100. The resilience of the nylon is said to provide a cushioning effect against shock and prevents the diamond chips from tearing out of their sockets. Belts are not affected by humidity and can be cleaned by washing in warm soap and water. They are impervious to oil, allowing the use of light oil

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production ideas

Continued

as a coolant. Five different colors for coding indicate the abrasive size. *Hartford Special Machinery Co.*

For more data insert No. 22 on postcard.

Spacing Collars

Micrometer adjustable for accurate spacing of milling machine cutters.

Quick, accurate and definitely positive adjustment for spacing milling machine cutters is accomplished by improved micrometer adjustable spacing collars. They are made for standard milling machine arbors from ⅞ to 2 in., and have a maximum adjustment of 3/16 in. by thousandths. They are provided with new high speed keyways. Accurate spacing is made by loosening the cutter arbor nut and making the plus or minus adjustment with a special spanner wrench which is furnished. *Dayton Rogers Mfg. Co.*

For more data insert No. 23 on postcard.

Double Hook Hoist

Handles long items in quantity; lifts and dumps barrels, drums.

This hoist lifts 500 lb at 25 fpm or 250 lb at 50 fpm. Hooks are spaced 48 in. apart, but can be adjusted for lesser distance. It is a complete hoisting unit with reversing motor, trolley, cable and hooks. It is supplied with swivel and adjustable trolley wheels to fit any size or make of track and will travel any size curve. The unit is adaptable for reversible power drive, with speed changes from 54 to 500 rpm possible by changing pulley sizes. *Flinchbaugh Co.*

For more data insert No. 24 on postcard.

Portable Electric Oven

For baking and drying; low-priced; has uniform temperature throughout.

Fresh air is drawn into the oven and stale air driven out through specially located vents by a motor-driven fan. It is claimed that no stratification is possible. An adjustable damper gives wide range of constant temperature. Ovens can be nested one on top of the other and used in groups, or operated as individual ovens. Selected ovens in the group can be cut-out or heated at different temperatures. They are made of heavy gage steel with asbestos air-cell insulation. *Grieve-Hendry Co., Inc.*

For more data insert No. 25 on postcard.

Electromagnet

Unit produces high flux density magnetic fields for laboratory use.

A new research tool now commercially available is the ADL electromagnet, a compact, versatile electromagnet for laboratory use. Its compact small cabinet requires only power and cooling connections. A minimum of operational supervision is required as it has built-in automatic controls and safety devices. The unit is said to produce the same magnetic fields as other electromagnets weighing many times as much. Other features include: variety of field patterns, accurately controlled air gap, simplicity of experimental setup, quiet operation and wide power range. *Arthur D. Little, Inc.*

For more data insert No. 26 on postcard.

Vacuum Furnace

Operated at high temperature, high vacuum or controlled atmospheres.

Engineered for versatility, operations such as heat treating, sintering, annealing, melting and pouring can be performed in this one packaged furnace. The power supply, vacuum pumping system, gages and controls are enclosed in a metal cabinet. The bell jar is hinged to a vertical base plate, with both sides accessible for servicing. The effective hot zone of the standard assembly is 5 in. high x 2½ in. diam. *National Research Corp.*

For more data insert No. 27 on postcard.

Centerless Grinder

For form grinding by in-feed method.

The new No. 4 centerless grinding machine announced by Scrivener operates upon the controlled-cycle principle. The grinding wheel measures 24 in. diam and up to 20 in. wide, the control wheel, 18 in. diam and up to 20 in. wide, with a maximum 9-in. opening between the wheels. Grinding wheel speed is 950 rpm. The control wheel has six speeds and an extra high speed for diamond truing the wheel. Power is

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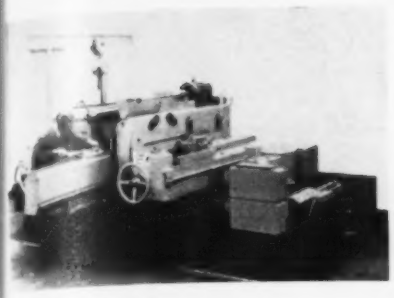


provided by a 35 bhp motor. This No. 4 centerless grinder is indicative of the field into which Scrivener centerless grinders are entering, namely, that of form ground work by the in-feed method. *Arthur Scrivener Ltd.*

For more data insert No. 28 on postcard.

Hydraulic Piston Grinder

Grinds cam shaped skirt portion of automotive pistons, 5 x 8 in.

The standard wheel of the 5x8 in. type H hydraulic piston grinding machine is 24 in. diam with a 3¼ in. face, driven by a 7½ hp motor. This facilitates grinding pistons by the plunge grind method with wide wheel. When arranged for traverse grinding, there is an automatic feed at each reversal of the traverse until the piston is to finish size. With a plunge grinding

cycle, feed is continuous until a predetermined size is reached, at which time the feed will stop. A reciprocating mechanism is used to reciprocate the wheel for fine finishes. With an overhead wheel dressing mechanism the grinding wheel can be dressed without disturbing the grinding setup. A new live spindle type headstock has V-belt drive and the piston grinding unit has a rocking action to obtain the cam contour on the skirt of the piston. Arrangement for a semi-automatic cycle of operation is possible. *Landis Tool Co.*

For more data insert No. 29 on postcard.

Selectronic Gage

Classifies critical dimensions of parts for selective assembly.

The Pratt & Whitney Selectronic gage classifies critical tolerances of precision parts such as balls, rollers, pistons and piston pins. It

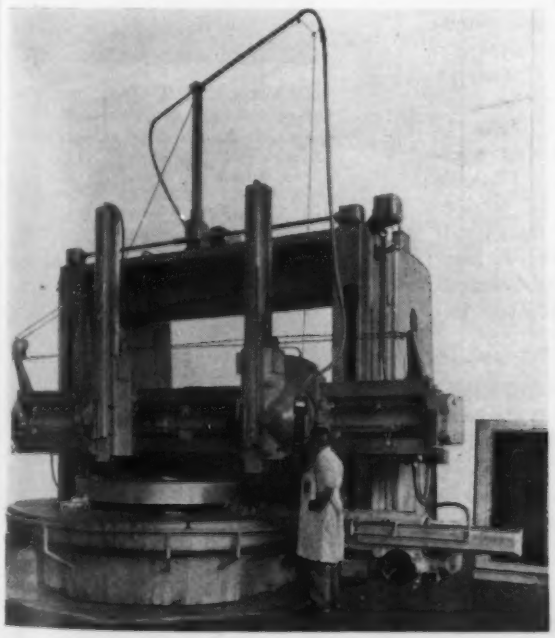
permits broader production tolerances in the manufacture of such parts because it provides a selective control for precision fitting at the time of assembly. Parts are loaded into a magazine-feeding mechanism from which they are automatically fed under an Electrolimit gaging head and subsequently routed into the proper classification bin. As each piece is gaged, an electric impulse passes through a commutator having size classification segments, and this actuates the chute-positioning mechanism. Only one set of masters, a minimum and maximum, is needed to adjust the gage. Selectronic gages are custom built. *Pratt & Whitney, Div. Niles-Bement-Pond Co.*

For more data insert No. 30 on postcard.

Boring-Turning Mill

Pendant control electro-hydraulic shift simplifies overall operation.

Advanced design features of the new 12-ft Cincinnati Hypro vertical boring and turning mill are pendant control electro-hydraulic shift and individual traverse motors to rail and side heads. Control functions handled through the pendant station include remote shifting of the single shift for the two table speed ranges that are obtained through a 50 hp adjustable voltage drive. The machine operator can observe cutting tool action and at the same time have finger tip control of the machine's feed and speeds. A metal cabinet encloses the motor-generator set and controls which operate the 50 hp motor. A new feed box provides 16 feeds between 0.004 and 0.750 in. Independent feed reverse for the saddle and ram means that either of these machine components can be moved up or down, in or out, individually. Control is by pushbutton. Three circular nonmetallic bed ways are used between the bed and table surfaces, offering improved contact and resulting in long, trouble-free service. Thread cutting, drum scoring, and taper turning are said to be greatly improved. *Giddings & Lewis Machine Tool Co.*



For more data insert No. 31 on postcard.

Mechanical Seals

Provide leakless operation of rotary shafts on pumps or other equipment.

No wear on the shaft is claimed for Garlock seals. Sealing is ef-

Turn to Page 91

IRON AGE *introduces*

Herbert Gordon, elected president of STERLING BOLT CO., Chicago. **Charles C. Gordon,** retired as president after more than 30 years with the company. Mr. Charles C. Gordon will become chairman of the board of directors. Other changes in personnel: **Harry Dorph,** associated with the company since its inception, has resigned, but will continue to serve on the board of directors. **P. T. Phillips,** elected vice-president and secretary.

Frank W. Jarvis, elected to the presidency of DIAMOND MAGNESIUM CO., Plainesville, Ohio.

William L. Hunger, formerly general manager, named vice-president and general manager of the Northern Equipment Div., CONTINENTAL FOUNDRY & MACHINE CO., Erie, Pa.

Paul M. Arnall, elected president of the LUKENHEIMER CO., Cincinnati. Mr. Arnall succeeds **Frank P. Rhame,** who resigned after 32 years with the company.

George H. Donaldson, named vice-president in charge of operations of both the CARBON LIMESTONE CO., and the CARBON CONCRETE BRICK CO., Lowellville, Ohio.

John P. MacLean, promoted to manager of the Buffalo district sales office of REPUBLIC STEEL CORP. Mr. MacLean succeeds **C. A. Cherry,** who resigned from the company.

John G. Munson, retired as vice-president—raw materials, UNITED STATES STEEL CORP. OF DELAWARE. Mr. Munson had a career of 30 years with U. S. Steel.

Charles W. Jinnette, retired recently, after 50 years of active service with the NORTON CO., Worcester.

Arnold Lenz, elected vice-president and member of the Administration Committee, GENERAL MOTORS CORP., New York. **Jack F. Wolfram,** recently appointed general manager of Oldsmobile; also elected vice-president and member of the administration committee.

Frederick W. von Raab, appointed manager of warehouse distribution for the CARPENTER STEEL CO., Reading, Pa.

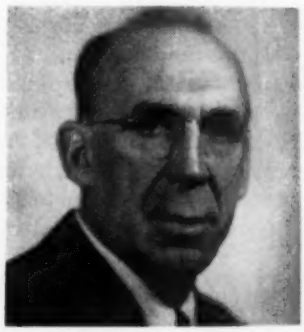
Ray E. Kalmbach, named general manager of Wilson Foundry & Machine Co., Pontiac, Mich., a wholly-owned subsidiary of WILLYS-OVERLAND MOTORS, INC.

Ab Martin, appointed manager of the Fort Wayne, Ind., Works of GENERAL ELECTRIC CO., Apparatus Department. Mr. Martin succeeds **C. H. Matson,** who was named manufacturing consultant of the company's Small Apparatus Div. staff. **G. Stanley Berge,** appointed buyer for the Plastics Div., Pittsfield, Mass. **John L. Galt,** appointed manufacturing engineer, Chemicals Division Phenolic Products Plant; **Robert L. Gibson,** named general manager of the Chemical Department, also **Robert J. Baumann** was named marketing research section manager of the Chemical Department.

James J. Monaghan, appointed general sales manager of the Waterbury Factory division, of the PLUME & ATWOOD MFG. CO., Waterbury, Conn. **Walter L. French,** appointed to the position of acting sales manager for the Thomaston Brass Mill Div.; **Frederick D. Keeler,** resigned as sales manager recently.

Turn to Page 42

JOHN M. YAHRES, elected president of the Pittsburgh Screw & Bolt Corp., Pittsburgh.



DAVID W. THOMAS, appointed executive vice-president and director of Dumas Steel Corp., Pittsburgh.

CHARLES G. COOPER, elected a vice-president of the Cooper-Bessemer Corp., Mt. Vernon, Ohio.

IRON AGE *salutes*

John I Snyder

HE'S young in years but old in experience. Forty-one year old John Snyder has the vigor to make his vision productive.

He's a bold thinker, not afraid to challenge the old, time-tested way of doing things—and change it if there is a better way.

He is the soul of brevity in word and act, can't tolerate waste motion in himself or others. He's really a plant efficiency expert, though he doesn't call himself that.

When he left Kuhn, Loeb & Co. in 1948 to become president of Pressed Steel Car Co., John Snyder found freight car building in the doldrums. Every sign indicated that this business was going to get a lot worse before it got better.

During this period when things could have gone to pot for his company, Mr. Snyder was working harder than ever before, finding new outlets and developing new products. He was also busy reorganizing the company, streamlining production, cutting costs, and getting his industrial house in order.

It was during this period, too, that John Snyder was directing a bold experiment in freight car building. This experiment resulted in the new Unicel freight car which was introduced last October (THE IRON AGE, Oct. 19, p. 89).

Although John Snyder is an industrialist, he might have done better than allright at several other jobs. He still likes to tinker with things electric, like radios and loudspeakers. But most of all he likes to make things grow. He is the proprietor of a nursery called Saltair at Shelter Island, New York.

RICHARD LESLIE MULLEN, elected vice-president of the Lehigh Structural Steel Co., Allentown, Pa.

GEORGE E. LOTT, elected vice-president in charge of purchasing, Automotive Div. of the Motor Products Corp., Detroit.

MARK M. BIDDISON, promoted to executive vice-president, General Chemical Div. of Allied Chemical & Dye Corp., New York.

JOHN E. TIMBERLAKE, appointed general manager of sales of Jones & Laughlin Steel Corp., Pittsburgh.

IRON AGE *introduces*

Continued

Thomas W. Russell, Jr., appointed assistant general purchasing agent of AMERICAN BRAKE SHOE CO., New York.

L. V. Johnson, appointed chief engineer of the NATIONAL TUBE CO., Pittsburgh.

R. K. Warren, appointed assistant manager of tool steel sales of CRUCIBLE STEEL CO. OF AMERICA, Syracuse, N. Y. **Ira G. Sutton,** appointed general superintendent of the Sanderson-Halcomb Works.

Robert W. Snowden, named as plant manager of the recently acquired New Brighton works of the HEPPENSTALL CO., Pittsburgh.

Albert Walton, named general manager of manufacturing by the BUDD CO., Philadelphia.

S. T. Mackenzie, appointed to the newly created post of sales manager of the BABCOCK & WILCOX CO., New York. **R. W. Buntin** succeeds Mr. Mackenzie as district sales manager of the Philadelphia office.

H. A. Forsberg, elected to the board of directors of CONTINENTAL FOUNDRY & MACHINE CO., Chicago. Mr. Forsberg has been associated with the company for more than 35 years.

J. C. Witherspoon, named assistant to general superintendent of the Donora Steel & Wire Works, of the AMERICAN STEEL & WIRE CO.; **Kenneth C. Shearer** succeeds Mr. Witherspoon as division superintendent, open hearth.

A. P. Hall, appointed a member of the board of directors of WALTER KIDDE & CO., INC., Belleville, N. J.

Frank Hallberg, named chief engineer of the ROSS OPERATING VALVE CO., Detroit.

Thomas C. Smith, named Milwaukee sales representative for ALLIS-CHALMERS MFG. CO. Others named: **E. E. Strickland, Jr.,** New York, and **Elwood C. Gerber,** Pittsburgh. **John F. Costigan,** named assistant works manager, at the Norwood, Ohio, branch.

Leon S. Kuhn, newly appointed manager of sales, Portland district, for BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco.

John C. Koch, appointed vice-president in charge of sales of the CONO-FLOW CORP., Philadelphia.

J. Richardson Dilworth, elected to the board of directors of ROCKWELL MFG. CO., Pittsburgh.

Robert J. Heggie, appointed general manager of sales of A. M. CASTLE & CO., Chicago, succeeding **Earl E. Bates** who retired recently.

Edgar L. McFerren, named chief engineer, succeeding **K. F. Gallimore** who will continue as a director, vice-president and consulting engineer of the GIDDINGS & LEWIS MACHINE TOOL CO., Fond du Lac, Wis. **Fred C. Freund** replaces Mr. McFerren as assistant to the executive vice-president and works manager; **Ray G. Commo,** promoted to supervisor of personnel and will head the industrial relations department.

William E. Close, appointed national account supervisor, eastern area, with headquarters in New York City, for the ACME STEEL CO. **Vincent F. Murphy,** replaces Mr. Close as New England district manager; **Gardner W. MacDonald, Jr.** and **George R. Timm,** assigned to the Boston sales territory; **William G. Polley,** sales engineer, assigned as area special representative in Atlanta. **Clarence A. Carrell,** appointed district manager of the southern division; **G. R. "Red" Easley,** appointed district manager, middle atlantic states; **Judd B. Farr,** assigned to the South Carolina territory; **John J. Jorgensen,** transferred to the Chattanooga, Tenn., sales territory.

John A. Petroskas, appointed chief metallurgist of the MIDVALE CO., Philadelphia.

OBITUARIES

Col. Eugene C. Peck, former general superintendent and a director of Cleveland Twist Drill Co., Cleveland, died recently at the age of 83.

Albert Browdy, scrap steel buyer for Republic Steel Co., Alabama, died recently after a short illness.

Carl E. Heussner, 51, chemist and engineer for Chrysler Corp., Detroit, died recently.

on the assembly line

automotive news and opinions

Auto producers resist vendor's price increases . . . Alloy shortages strike . . . Buick introduces 1951 models.

by Walter G. Patton

Dec. 1 Rollback — Automobile companies are passing along the hold-the-price line policy to their vendors. A letter from purchasing vice-president, Irving A. Duffy, told 6000 Ford suppliers last week to avoid price rises above Dec. 1 levels. There are also indications that some auto firms may ask their suppliers to certify that the price of their product qualifies under the government pricing formula. Several GM divisions have also notified vendors that their accounting department has been instructed not to accept any price increases above Dec. 1 levels.

Some exceptions have been made in the hold-the-line policy. Suppliers of rubber products, for example, have been permitted to make upward revisions in view of the steep climb in the price of both synthetic and natural rubber.

Truck Prices Up—There has been some opposition to the price position taken by the car manufacturers. Vendors are pointing out, for example, that auto firms are asking them to roll back prices voluntarily although some of these same companies have increased the price of their trucks.

Orders Up in Stars—When auto firms get a government contract nowadays, the orders sometimes reach astronomical proportions. Suppliers of trucks, for example, have reported substantial increases in government orders. An unconfirmed report indicates Ford may be asked to increase its output of aircraft engines at Chicago several times.

Cast Iron Pistons—The question of whether cast iron pistons will sweep the industry in 1951 is still undecided. Originally it was expected that Buick would start production on its 1951 Special Series with cast iron pistons. It is now definite that aluminum pistons will not be used during the first quarter at least. Both a downward revision in schedules and the slightly improved aluminum supply situation have contributed to the decisions to continue with aluminum pistons.

During the coming months in which automobile production schedules may be sharply reduced, it should be expected that many promised substitutions for critical aluminum and copper will not be necessary.

Auto Output Cut — Some informed observers now believe the cut in future automobile production schedules will not be proportional to changes in supplies of steel, aluminum, copper and other critical materials. Rather, it is reasonable to believe that as fast as government contracts are placed and auto workers can be transferred to war work, auto production schedules will be reduced. This is not an established policy but the trend seems to be running strongly in this direction.

Alloy Shortages — The shortage of alloying elements has already resulted in substantial changes in material specifications for the automobile industry. Nickel has practically disappeared from large forming dies. With chromium and molybdenum in shorter supply, Detroit foundries may find it necessary again to use steel inserts in the dies to prevent excessive wear of soft iron.

This practice was extensively used during World War II. One result of this practice is to increase substantially the cost of machining the die.

Big Chunk of Output — There are growing indications that the requirements of DO orders for hot-rolled bars may reach 50 pct of production even though steel producers are now required to take only 15 pct out of each month's output.

Some steel mills are booked as far ahead as June on DO orders for hot-rolled sheets. At the moment hot-rolled bars, both carbon

assembly line

Continued

and alloy, are as critical as hot and cold-rolled sheets. The possibility that this situation may be alleviated by conversion is very slim.

Old Order Confusion—Most Detroit observers are hoping that if a price freeze is ordered on steel scrap, it will be ordered as of a given date. Local observers have pointed out that where a price freeze is announced ahead of time, tremendous confusion in cleaning up old orders has invariably resulted.

Olds War Contract—A second defense contract has been announced by Oldsmobile which previously disclosed it will produce 3.5 in. rockets for the Army's new super bazooka. Olds will produce high velocity guns for the U. S. Army's medium tank. The 15-ft gun tubes will be machined in a new building now under construction at Lansing. The structure was originally intended for steel storage and plant engineering shops.

More than 200 machine tools will be needed, including turning and boring lathes, rifling and honing machines, milling, grinding and broaching machines. Some heat treat equipment will be needed. During World War II, Olds made 75 mm and 76 mm guns for medium tanks.

New Engine, Body—The 1951 Buick Special has a new Fisher body and a new engine. It also has a new chassis. Rear fenders are integral with the rear quarter panel, eliminating the use of fender welts.

Buick is continuing its unit bumper-and-grille construction. The wrap-around bumper is reinforced by two massive "bumper bombs" and two extra grille guards. The 25 grille guards are mounted on a frame which, with the "bombs," are bolted to the bumper bar. Grille bars are stampings rather than die castings. Being attached to the bumper, the grille bar flexes with the bumper.

Tubular Axle Rods—Hub caps and wheel covers are a new design with the word Buick in script across the face. A one-piece bumper face plate wraps around the ends of the rear fenders. Buick is again using an X-member frame. Rear axle rods are tubular rather than channel type.

The F-263 valve-in-head straight eight engine has 7.2 to 1 compression ratio for Dynaflow transmissions. With Synchro-Mesh transmission, the compression ratio is 6.6 to 1. The new engine for the Special features lower height, shorter connecting rod and shorter pistons and uniform diameter crankshaft bearing journals. Hydraulic valve lifters will be used on all Series 50 and 70 models and on all Dynaflow-equipped Series 40 models.

Similar to Tanks—An important engineering change is the use of segmented brake linings, similar to brakes used on heavy tanks during the last wear. The segments are of unequal length and are cemented to the brake shoes. Purpose of this design is to produce lower brake lining temperatures and provide additional cooling area. The brakes are also said to be self-cleaning.

Buick is offering E-X-Eye glass, developed jointly with Libbey-Owens-Ford, to reduce sun glare and heat. The windshield has a dark green glare-reducing band at the top, averaging 3¾ in. in width. The shaded top band then fades into a lighter shade designed to meet driving and styling requirements.

Vital Transportation—How necessary is an automobile? AMA has a ready answer: A survey made by Michigan State Highway Dept. showed that 75 pct of 434,-684 employees in 749 Michigan plants came to work in private autos. AMA says further that reports from 94 plants scattered throughout the country covering 140,000 war workers showed 73 pct rode in cars to their jobs. After the war, reports from 32 areas indicated that 52 pct of car trips are for the purpose of making a living, AMA contends.

THE BULL OF THE WOODS — **By J. R. Williams**

"Product Quality Stepped Up... *Thousands of Hours, Dollars Saved!"*

REPORTS **RADIO STEEL & MFG. CO.**
CHICAGO, ILLINOIS

STURDY . . ."boy-proof". . . built to take a beating. These are requirements a good coaster wagon must meet. No one knows this better than Radio Steel & Mfg. Co., world's largest exclusive manufacturer of coaster wagons and scooters.

Radio Steel recognized that fasteners have a lot to do with the ruggedness of their wagons. That's why they were willing to investigate the possibility that SPEED NUTS could provide strong, resilient, vibration-proof fastenings. SPEED NUTS proved out on every test devised. Now they are the standard fastening method used on the entire RADIO LINE®.

Primarily interested in increasing product quality, Radio Steel was also pleased with thousands of hours and dollars saved from the changeover to SPEED NUTS.

Perhaps your product quality . . . and your profits . . . can be stepped up by SPEED NUT brand fasteners. The first step in finding out is to call in your Tinnerman representative. Also, write for your copy of SPEED NUT Savings Stories, a 32-page book of actual case histories. TINNERMAN PRODUCTS, INC., Box 6688, Dept. 12, Cleveland 1, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales.

west coast progress report

digest of far west industrial activity

by R. T. Reinhardt

Big Things Brewing—Although plans and market studies can't fill cupolas and openhearths, a preview of things to come may afford hope for those who believe further steel expansion in the West is limited by availability of additional sources of metallics.

Still in the hush-hush stage are plans for limited production of pig iron in Canada and Mexico, and a third blast furnace at Fontana, Calif. These independent proposals seem to have a reasonable prospect of reaching the production stage.

It will be at least a year before any of these new producers can enter the market and in the meantime both foundries and steelmakers are digging deep for scrap.

As Was Expected—It was no surprise to western steel producers when they learned last week that representatives of at least one of the steel companies contemplating an eastern seaboard plant was making market studies of western consumption.

Deficiencies between production and consumption in the West have been estimated at from 1 million to 2 million tons but even the market analysts can't say with any degree of accuracy which finished products are in shortest supply.

Getting Tough — Foundries in Los Angeles County have been issued an ultimatum by the Los Angeles Air Pollution Control District to the effect that they must at least be able to produce purchase orders for smog control equipment.

Because of difficulty in obtaining suitable material the Control Board had issued and renewed variances from time to time to permit continued operation, but the latest order indicates a forthcoming clampdown.

Foundries which have made arrangements with manufacturers for installation will reportedly be granted a stay until equipment is delivered.

Los Angeles foundries recently raised wage scales approximately 6¢ an hour, which is approximately 1½ pct of a recent 5 pct increase in prices put into effect by the foundries. Increased costs of raw material—primarily pig iron and scrap—account for the other 3½ pct.

Hard on Tinplate — More tinplate will be used up by western canmakers this year than ever before.

American Can Co. is expected to have its new Los Angeles Harbor plant well under way by June with a capacity of 350 million units per year.

Pacific Can Co. is expanding its San Francisco plant by approximately 50 pct. Floor space has been increased by 85,000 sq ft and when the addition is completed the plant is expected to produce about 850 million units per year.

Plenty of Elbow Room—Development of a 5000 acre industrial community surrounding Kaiser Steel Corp. at Fontana, Calif., is under way.

Kaiser Steel, Southern California Edison Co., Southern Pacific, Santa Fe Railway, Southern California Instrument Co., the Metropolitan Water District and Union Pacific are all interested in the development, as is the Bank of America and other firms.

Rheem Expanding—Rheem Mfg. Co., Richmond, Calif., is expanding facilities by construction of a 200,000 sq ft building at a cost of approximately $1 million at San Pablo, Calif.

Rheem makes steel drums and household water and space heaters, and during the last war made depth charges and steel drums for the Armed Services.

From Alumina to Uranium—Built during World War II to produce alumina from alunite, the Kalunite plant in Salt Lake City will be used to convert various types of uranium ores to uranium oxide for the Atomic Energy Commission.

the federal view

this week in washington

by Eugene J. Hardy

Price Controls Orders — Temporary abandonment of plans for a general 30-day price freeze has given new impetus to the drafting of individual maximum price orders for basic products, including steel.

The fundamental problem that continues to plague the government's price stabilizers is simply this: Staff of fewer than 400 persons, many of them serving as per diem consultants, are swamped in a mass of pricing data on virtually every commodity and service the nation produces and sells. Unless the Economic Stabilization Agency decides to extend its present voluntary "hold-the-line" agreements with a number of basic industries, or re-examine the 30-day freeze proposal, the actual issuance of product-by-product price ceilings on a large scale would appear to be some weeks away.

On OPA Pattern—Preliminary drafts of ESA orders setting maximum prices on steel and numerous other metals are now being circulated among the price-control agency's limited staff. In some cases, the orders are in the completed stage, lacking only the actual price-ceiling figures and effective dates. Most of them parallel their counterparts which were in effect 5 years ago at the demise of OPA.

But with the exception of "a few cases," nobody in ESA is able to come up with the right formula for controlling prices in the great majority of the producing industries.

Small Business Agency — Don't be surprised if an agency similar to the controversial Smaller War Plants Corporation of World War II is a part of the Washington scene before 1951 rolls to a close. Small business proponents are rallying behind the Small Business Defense Plants Act, reintroduced by Sen. Sparkman, D., Ala., and Rep. Patman, D., Tex., chairmen of the Senate and House Small Business Committees, respectively.

The measure provides for loans to small business for plant expansion and construction; government aid in acquiring materials and machinery; and help in getting government contracts.

Production Men Wanted — Defense Mobilizer Charles E. Wilson wants production men from industry to fill top spots in the mobilization agency set-up. Mr. Wilson continues to emphasize the need for greater output from all industry rather than more controls designed to divide up the existing production pie. It is reported that he is none too happy about the type of individual now moving into key posts where contact with industry is the primary job.

Business and industry are going to have to come up with men to fill these spots unless they want to suffer with the misfits, has-beens, and hare-brained economists which characterized a number of the World War II agencies. This type of individual is control-minded and does not fit into Mr. Wilson's picture for expanding production.

Get the Monopolies—Congressman Celler, D., N. Y., said last week his campaign to "get the malefactors who want to monopolize steel and other industries has just begun."

As chairman of a now-defunct committee to investigate monopolistic practices during the recently-expired Congress, Mr. Celler went after "big steel" hammer-and-tongs in his preliminary efforts.

Celler Seen Stymied—The final report of Mr. Celler's committee did not back up his earlier charges, however. In a factual, but politically-inocuous 92-page report, the committee simply summarized testimony presented to it by various officials of the metalworking industries. Any conclusions or recommendations are conspicuous by their absence in the report.

The present general lack of enthusiasm for Fair Deal measures in the House would seem to indicate that Mr. Celler's campaign won't get very far in the new Congress.

NBS Meeting — The country's leading scientific societies will meet in Washington during 1951 in observance of the 50th anniversary of the National Bureau of Standards. NBS, created by Congress Mar. 3, 1901, is the principal agency of the Federal Government for scientific research.

ONE DRAW
reduces 40-in. diameter blank
66 PCT

By GEORGE ELWERS
Machinery Editor
THE IRON AGE

BLANKS nearly 40 in. in diam are being reduced approximately 66 pct to cups with a length-diameter ratio of nearly 1.7:1 in a single press stroke in drawing operations at Scaife Co., Pittsburgh. Beyond this, achieved in regular production, Scaife research has seen successful reductions as high as 78 pct in one stroke. The method used is reverse drawing, in which the press transforms a blank into a shallow cup, then literally turns the cup inside out as it continues the draw, all in one continuous stroke.

Scaife presently uses the process in manufacture of liquefied petroleum gas cylinders of 14½-in. diam. Dies are ready for production of a 20-in. size, and plans are being made to produce cylinders of other sizes from 6 to 36 in. in diam, as well as other Scaife products of various sizes. Scaife engineers haven't had much time yet to think of other potential applications, but don't doubt that there will be many. Along national defense lines, for example, reverse deep drawing might well be used for such products as shell bodies, shell casings, rocket and missile bodies, and rocket motor tubes.

Reverse deep drawing is not completely new. It has been used in Germany and at the time

Reverse drawing enables production of 14½-in. diam gas cylinder halves in a single press stroke. Diameter reduction of the 40-in., 12-gage, high-tensile steel blank is nearly 66 pct. Length to diameter ratio of the finished cup is almost 1.7:1. In this application of reverse drawing one press does the work of several, and handling and heat-treating between draws is eliminated.

Scaife became interested, Buhl Mfg. Co. and Wheeling Steel were making small parts of relatively light gage steel by this method. But nobody had ever successfully used steel of such thickness or made parts of such size, as Scaife contemplated. And, the press and dies developed by Schaife and the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, form the basis for the use of reverse deep drawing by the other companies now in the field.

Scaife hadn't done any drawing before adoption of reverse deep drawing. Its line of pressure vessels for air, gases and liquids was fabricated from sheet rolled into cylindrical shape. When Scaife decided to reduce manufacturing costs by going to the two-cup type of gas cylinder, it asked HPM to build a press and dies capable of making cups in a straight draw of approximately 50 pct reduction. The method then in use for producing the two-cup LP gas cylinder made each of the cups, which are later welded together to make the cylinder, in four drawing and ironing or sizing operations, with a stress-relieving heat treatment between each operation. But Scaife wanted to avoid the investment in equipment and floor space that this would entail.

Straight Draw Not Successful

The press and dies were built, and trial runs in HPM's plant proved that the 50 pct reduction could be accomplished in one draw—sometimes. Some heats of steel worked well, but others didn't, and it became apparent that the scrap rate would be prohibitively high. So it was decided to try reverse deep drawing, for which HPM designed a special press.

The 14½-in. diam cylinders currently being produced are formed from two cups, each identical as made on the press. They start with a blank about 38 in. in diam, of 0.10-in. nominal thickness. The finished cup is 14½ in. in diam, and about 24½ in. long, with a closed crowned top and a flange at the open bottom.

During the process, the steel work-hardens enough to make it a little too hard for the subsequent trimming operation. So when the cup is removed from the press, it is placed on its side on a roller conveyer which carries the flanged end under a row of gas burners which heat it to about 1400°F and draw back the hardness.

The handling of these cups after drawing has been thoroughly mechanized by Scaife through the use of roller conveyers. Once a man has lifted a cup from the press with tongs and placed it on the conveyer, further handling is almost entirely automatic, including travel along conveyers, turning the cup on end for washing and on its side for joining and welding, and delivery to and ejection from trimming and welding machines. From the press, the conveyer carries the cups past the burners and then through a washing machine to a Scaife-designed trimmer with two sets of tools which operate alternatively. A rotary knife on this machine simply trims the flange off of alternate cups. Every other cup is trimmed by the other set of tools, which not only cuts off the flange, but gives the cut edge a bead which will later be fitted inside the end of a plain trimmed cup to form a lap joint for welding.

Die Radii Are Critical Design Factors

The plain trimmed cups, which will become cylinder tops, are conveyed to an area where a boss hole is punched and a boss ring attached by submerged arcwelding. They then roll along the conveyer to meet the trimmed and beaded bottom cups at a hydraulic press, where the two are pressed together and roll down a conveyer to one of two welding machines. One of these machines is shown in Fig. 2, the second machine being out of sight at the left.

These Lincolnweld submerged arc machines weld the two cups together, and at the same time weld on a stand ring, a ring extending below the dished bottom of the cylinder to permit standing the cylinder upright. Scaife doesn't like to waste metal. These rings, now rolled

FIG. 1—Removing a finished cup from Scaife's 750-ton HPM press. Two of these cups, with their flanges trimmed, are welded together to make a gas cylinder. The roller conveyer at the left is the start of a system which carries the cups through washing, heat-treating, welding and other steps in manufacture, with almost no further manual handling.

from strip, will soon be made from metal trimmed from one of the cups. Both cups will be drawn to a little greater length to compensate for this. In another example of metal savings, the Info-Crown nameplate attached around the boss at the top of the cylinder is made from a corner left when the cylinder blank is cut from a square sheet.

Following welding, the cylinders undergo a preliminary air pressure test for leaks. Then they are heat-treated in a pusher-type controlled atmosphere furnace to restore tensile and ductility properties. Then come further tests, cleaning and painting.

At present, Scaife uses the HPM 750-ton press shown in Fig. 1. It has a 60x60-in. bed, 135-in. daylight and an 84-in. stroke. Full pressure is not required when working the steel being used for the 14½-in. cylinders. On current work, ram pressure is about 200 to 250 tons, blank holder pressure 125 to 150 tons, and cushion pressure about 75 to 100 tons. Drawing is done at the maximum press speed of 205 ipm. There is no indication that drawing could not be done faster were the press capable of it. HPM is now building for Scaife a 1500-ton press with an 84x84-in. bed, 108-in. stroke, 183-in. daylight, and a maximum speed of 260 ipm, which will be the largest press ever built for reverse deep drawing.

Proper die design is of great importance in success of reverse deep drawing. The operation is unusual in that no ironing is done. In fact, die clearances are very liberal. Except for a minimum which must be maintained, die clearance is not critical and is usually made quite large. Scaife has drawn material all the way from 0.050 to 0.110 in. thick with the same dies. Critical die design points are the radius on the draw ring, the radii on the hollow punch, and the angle on the hollow punch and the cushion. The approximate shapes at these points are illustrated in the accompanying box. Thickness can be very accurately held if these are correct, and if blank holder pressure and the pressure differential between the hollow punch and the cushion are correct.

Tool Steel Inserts Cut Die Wear

Inserts in the draw ring, and the heads of the hollow punch, solid punch, and cushion, are of high carbon-high chrome tool steel. In production of over 100,000 cylinders, these surfaces have shown no measureable wear. Lately, hardened Meehanite has been used instead of tool steel for some die parts, and while it does wear, indications are that it may be more economical in the long run than tool steel.

Scaife has experimented with various wet lubricants, but to date has found none that can stand up under the pressures and temperatures

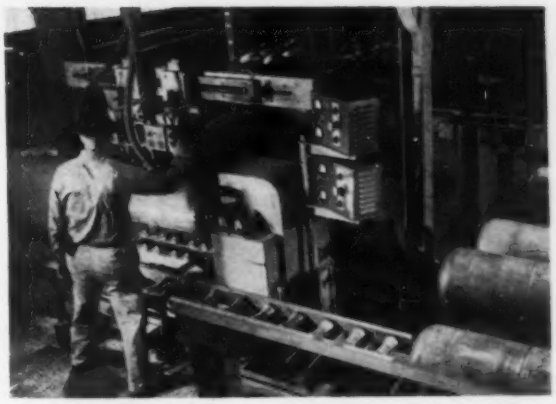
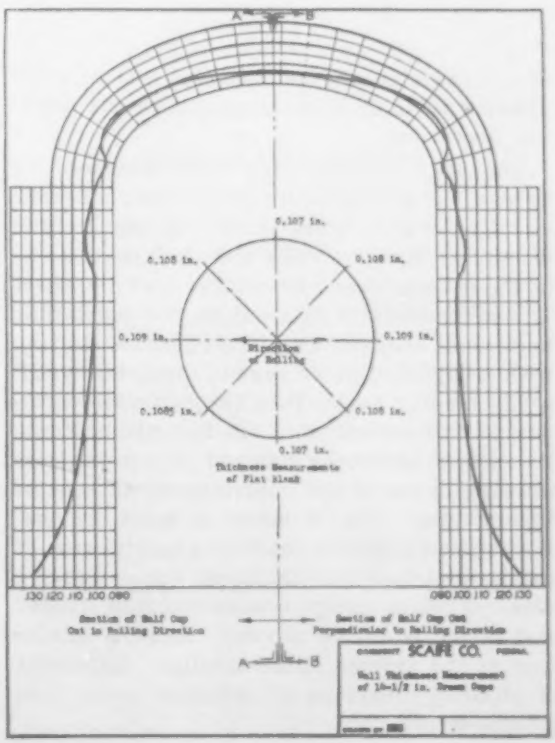


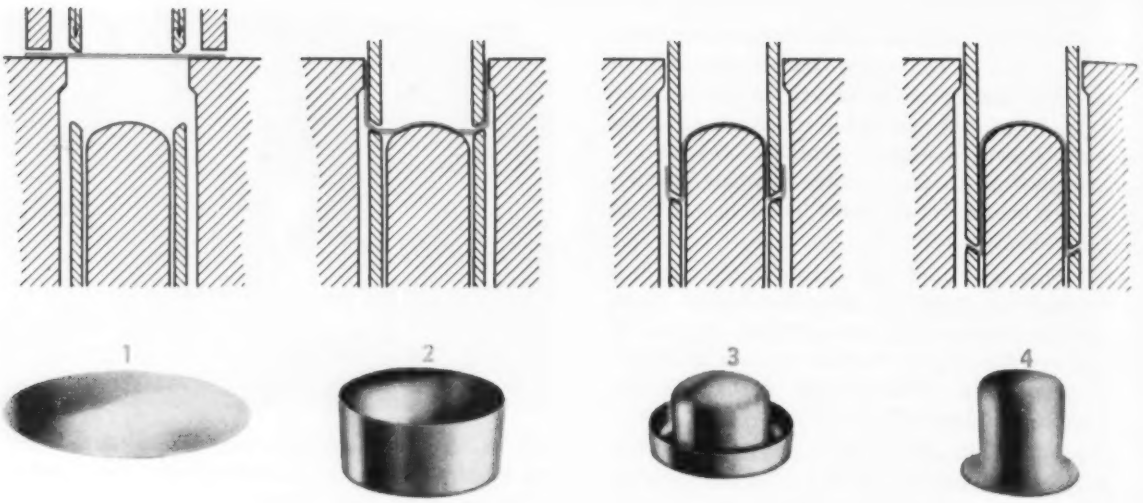
FIG. 2—Automatic submerged arc-welding is used to join the cylinder halves. Simultaneously, a stand ring is welded on at the bottom of the cylinder.

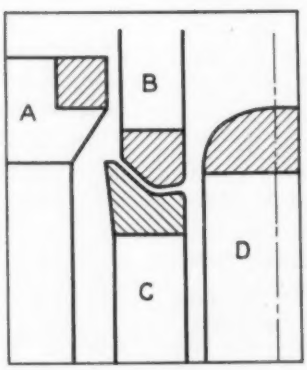
of the process. It is now using a soap lubricant, applied wet in a thin film and dried, in a Scaife-designed machine.

The material used in production of the 14½-in. cylinders is an annealed high-strength low-alloy steel, used to keep weight as low as possible while still meeting the extremely rigid Interstate Commerce Commission physical specifications for LP gas containers. Scaife used to specify that the steel be pickled prior to annealing, but has discovered that the tight coat

FIG. 3—Wall thickness of cups is accurately held in reverse drawing. This is a typical thickness chart made from a cross-section of a cup for a 14½-in. cylinder half. Note that variation is less than ±0.005 in. except near the flange at the open end, which is trimmed off anyway.







▶ These simplified schematic drawings illustrate how reverse drawing works, using a Scaife LP gas cylinder half as an example.

(1) The process starts with a flat circular blank, held down by a blank holder against blank ring A. Downward motion of the ram causes formation of a shallow cup by the hollow punch, B.

(2) The blank holder pressure is removed at just the right time so that the cup is formed without a flange, and occupies the position shown, in the die. At this point the cup bottom is in contact with the stationary solid punch, D. And the descent of the hollow punch has pushed the cup against the ring, C, free to move down against oil pressure.

(3) Continued downward motion of the ram now literally turns the shallow cup inside out. Its bottom, which becomes the top of the final cup, is held and shaped by the solid punch. Its walls are drawn between the hollow punch and the cushion. Correct pressure for this operation is obtained by regulating the differential between the ram pressure forcing the hollow punch downward, and the resisting pressure of the cushion.

(4) The completed cup, with its flange trimmed off, forms half of a LP gas cylinder. All of this is accomplished in a single continuous stroke of the ram. Shaded areas in the sketch showing the approximate shape of the die parts, are tool steel inserts.

of reduced scale on steel annealed without prior pickling is, if uniform, beneficial to the drawing operation.

The ICC specifies that wall thickness on 14½-in. LP gas cylinders be not less than 0.083 in. The critical point occurs at the knuckle where the straight walls and the crowned end of the cylinder meet. In reverse drawing, there is less tendency to thin out at this point than in straight deep drawing. This permits starting with a slightly lighter gage of steel, while still easily holding better than the minimum thickness at this critical point. In fact, the uniformity of wall thickness obtained in reverse deep drawing is one of the important advantages of this process. Fig. 3 shows a graph of wall thickness of a section cut from a typical cup. It can be seen that wall thickness varies no more than ±0.005 in. except toward the open flanged end, which is cut off anyway. Another advantage of the process is the excellent uniformity of physical properties of cylinders made from reverse-drawn cups.

In its research, Scaife has successfully applied reverse drawing to many different materials, such as 302 stainless, aluminum, copper and Monel. It believes reverse drawing can be used for non-cylindrical shapes such as rectangular transformer cases, and for conical shapes. It sees no apparent limit to the thickness of metal that can be reverse drawn, and is, in fact, considering applying deep drawing to the manufacture of high-pressure vessels. Scaife also envisions the possibility of making an entire cylinder, closed at both ends, on the same press, thus eliminating the welded joint.

Scrap Rate Is Low

At the beginning of work with deep drawing, scrap loss at Scaife was, of course, quite high. But its overall average, now, including the high initial rate, is down to around 6.4 pct, and the current rate is comfortably below 4 pct, an excellent indication of the success attained with deep drawing on work which had once been considered impractical.

Cadmium-tin alloy plating stops corrosion

Extensive tests led to the development of a successful cadmium-tin alloy plating solution. The deposit is obtained from a fluoborate solution and contains approx 75 pct Cd and 25 pct Sn. Far greater corrosion resistance in low alloy steel is achieved than with cadmium or tin of comparable thicknesses.

CORROSION problems are serious ones in the manufacture and operation of aircraft engines, whether reciprocating, jet, or gas turbine. The reciprocating engine is particularly susceptible due to the low corrosion resistance of the steels normally employed. Jet and gas turbine engines have special problems of high temperature corrosive attack which will not be discussed here.

Previous methods of protecting steel parts in reciprocating aircraft engines have not been entirely satisfactory or desirable. Application of a thermosetting resin is being used extensively with some success. This method, however, has many limitations. It only offers physical protection; its thickness is 0.0005 in.; it is hard and brittle; and it chips easily.

Interest had been aroused[1] in the use of a thin tin deposit covered by an equally thin cadmium deposit which was subsequently heat treated to diffuse the two coatings. The total thickness of the finished coating was 0.0001 in. and was found to afford excellent protection to steel. An investigation was started to verify the corrosion resistance information that had been presented for the overlay cadmium-tin plate.

Test panels, measuring 2 x 4 x 1/16 in., were prepared from SAE 1020 steel and used for all tests. No variation of cleaning cycle was made throughout the investigation; a standard soak type alkaline cleaner followed by a rinse, neutralizing acid dip, and a final rinse was used for all panels. The primary interest was to produce an electro-deposit that would furnish high corrosion resistance for steel; the end results were successful (patent application filed for the plating bath developed).

Nearly every panel plated was subjected to the salt spray test so that a considerable amount of data were obtained. At first, the data were hard to believe but continued reproduction indicated good corrosion resistance. A deposit of 75 pct Cd and 25 pct Sn was chosen as the ideal, although some variation from this composition does not reduce corrosion resistance appreciably. Average values for the appearance of initial corrosion are listed in Table I.

Displays High Resistance

Many panels were left in the salt spray test after initial corrosion had occurred in order to determine the rate of advance. In all cases, the cadmium-tin alloy showed a very slow rate of advance. Numerous panels that exhibited initial corrosion at 600 to 700 hr were left for a total of 2000 hr at which time very little additional corrosion had taken place.

This characteristic of apparent anodic protection was highly desirable for the production of aircraft engine parts. During assembly, these parts often come in contact with each other. If this occurs, the effectiveness of the cadmium-tin coating is not destroyed. When chipping of a thermosetting resin takes place, its effectiveness

By B. E. SCOTT, *Senior Chemist*, and R. D. GRAY, Jr., *Former Senior Chemist*
Wright Aeronautical Corp., *Wood-Ridge, N. J.*

TABLE I

CORROSION IN SALT SPRAY

Cd-Sn Plate, Thickness, in.	Time,* hr
.00005	384
0.0001	1000
0.0003	3720
0.0004	none after 30 mo.
0.0005	none after 30 mo.
Cadmium	
0.0001	120
0.0003	360
Tin	
0.0001	48

* Time for initial corrosion to appear.

Cadmium-Tin Plating

Continued

is completely destroyed in the chipped area. Further evidence of anodic protection afforded by cadmium-tin was obtained by additional salt spray and humidity cabinet tests. Panels were cross-scratched through the deposit so that the base metal was exposed. Corrosion occurred in the scratch after 450 hr of salt spray test. No corrosion was evident after 1000 hr in the panels tested in the humidity cabinet.

Many aircraft engine parts have subsequently been plated with cadmium-tin and subjected to experimental operation. No detrimental effects of any nature have been found due to the deposit. On wearing surfaces, a burnishing effect appears to take place so that after considerable operating time, there is still evidence of a deposit. This may be due to a lower coefficient of friction than steel. Preliminary torquing tests with cadmium-tin and cadmium plated studs and bolts indicate more consistent values for the cadmium-tin.

Preliminary Tests Show Promise

Tin was first deposited from a regular sodium stannate bath to a thickness of 0.00005 in. followed by a similar amount of cadmium from a regular cyanide bath. The panels were then heated for 30 min in air at a temperature of 335° ± 5°F. For comparative purposes, panels were also plated 0.0001 in. thick with cadmium and to a similar thickness of tin. All of the panels were then subjected to salt spray[2] where they were examined every 24 hr. The first series of panels plated verified the previous information. The cadmium-tin overlay plate exhibited far better corrosion resistance than either of the regular plates. Microstructures are shown in Figs. 1 and 2.

Since the cadmium-tin deposits produced such promising results for resistance to salt spray corrosion, it was decided to investigate the possibilities of co-deposition of the two metals. A cadmium-tin plating solution[3] which could produce an alloy of cadmium containing up to 0.10 pct Sn was found. This tin content, however, was far below that deemed necessary for this program. Tin-zinc alloy plating,[4] as extensively used in Great Britain, was also examined.

Several plating baths were formulated using

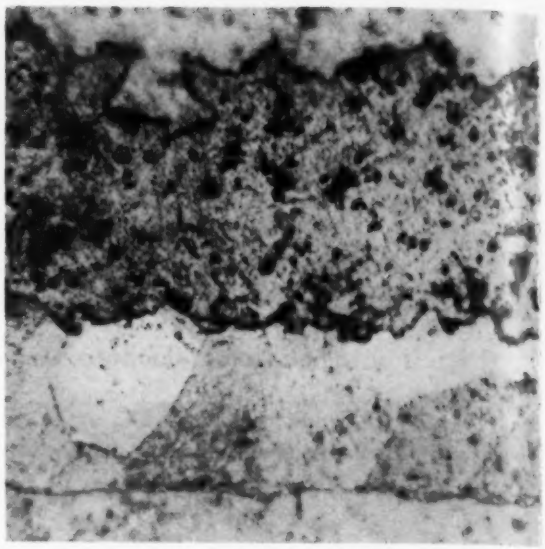


FIG. 1—Cadmium-tin overlay plate as deposited. Tin is in the large grains at the bottom, with the cadmium layer at the top. Etched 10 pct NaOH. 500X.

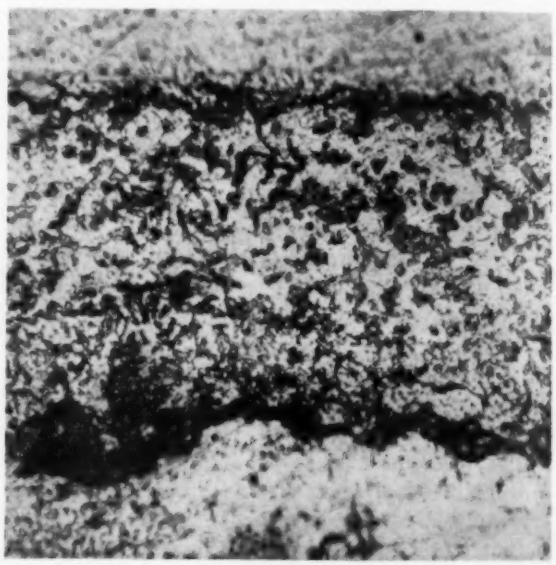
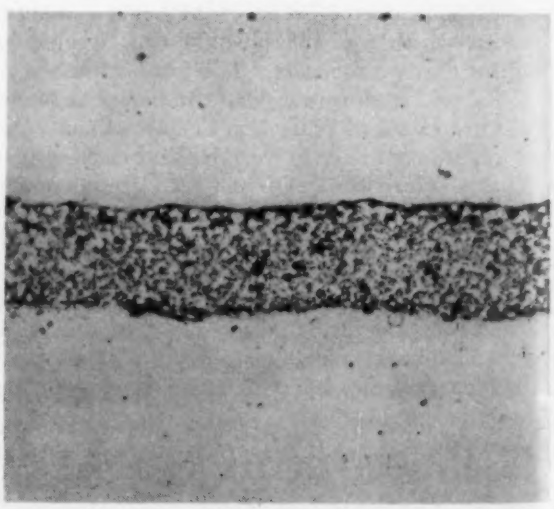


FIG. 2—Cadmium-tin overlay deposit after diffusing in air at 350° F for 30 min. Note diffusion of the tin through the cadmium matrix. Etched 10 pct NaOH. 500X.

FIG. 3—Co-deposited cadmium-tin from the new fluoborate bath. Etched 10 pct NaOH. 500X.



sodium stannate and cadmium oxide in a cyanide bath with little success. In all cases, practically pure cadmium resulted at the cathode. Inasmuch as tin is bivalent in an acid plating solution and tetravalent in an alkaline bath, the rate of deposition is double when operating below a pH of 7. This also results in a greater cathode efficiency and reduces hydrogen evolution at the cathode.

To study an acid plating bath, General Chemical Co. supplied solutions of cadmium fluoborate and tin fluoborate. It was hoped that a mixture of these solutions would produce an alloy plate sufficiently high in tin. Another advantage of such an acid solution over an alkaline bath is its higher electrical conductivity, which results in high anode and cathode current efficiency. Also, it was hoped that operation at room temperature would be feasible.

A number of fluoborate cadmium-tin baths were formulated and test specimens plated in them were submitted to salt spray tests. These baths produced deposits having tin contents ranging from 10 to 90 pct. After extensive testing it was determined that the optimum range of tin values was between 20 and 35 pct for maximum corrosion resistance. Microstructure of the cadmium-tin plate, co-deposited from the fluoborate bath, is shown in Fig. 3.

Operating pH Range is Narrow

Since the process produced an alloy plate, considerable time was spent in selecting the proper anodes. Anodes containing various percentages of tin and cadmium were cast and tried in the bath, as well as plain cadmium and tin anodes. The best anode corrosion and adequate maintenance of metal content in the bath were obtained from individual anodes of cadmium and tin with a surface area ratio of 1:3. It will be noted that this ratio is the opposite from the resultant deposit. A ratio of 1:1 for anode to cathode area was found to be satisfactory. No burning of the anodes occurred at this ratio. A smut formation on the anodes during operation of the bath made it necessary to bag them to prevent bath contamination.

The operating pH range was fairly narrow, best operation occurring between 2.5 and 3.0. If the pH drops appreciably below 2.5, the tin content of the deposit increases and corrosion resistance is lowered. The same is true if the bath is operated at a high current density.[5] The maximum operating range of current density was 10 to 80 amp per sq ft for a bright deposit of suitable tin content. The anode efficiency is high and, for all practical purposes, the cathode efficiency was 100 pct, which is typical of fluoborate plating solutions. Cathode efficiencies, calculate from Haring Cell data, are shown in Fig. 4.

Polarization effects at both the anode and the cathode were rather small. This was particularly

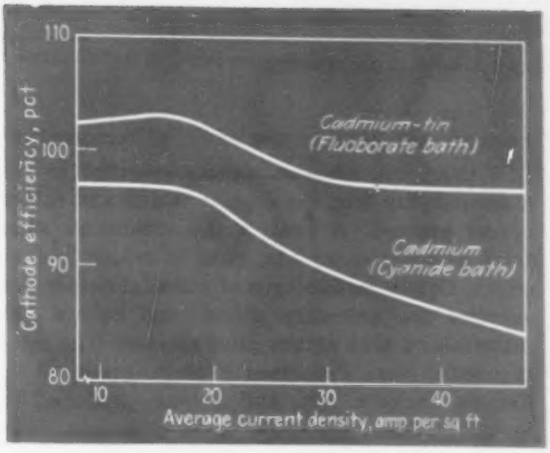


FIG. 4—Cathode efficiencies as obtained from Haring Cell data show the new fluoborate bath to average near 100 pct values.

true at the low current densities used to deposit 0.0001 in. of alloy. At high current densities, oxygen release at the anode changed the polarization picture somewhat. Measurements with a Haring Cell indicated that the bath has a resistivity or specific resistance of 2.4 ohm-cm. Since there is no pronounced cathode polarization effect, the throwing power of the bath is good.

Like many other plating baths, the use of agitation permits an increase in the limiting current density. Since the authors were not concerned with heavy deposits, the actual limiting current density for an agitated bath was not determined. The normal still plating time to deposit 0.0001 in. of the alloy is so small that increasing the plating rate by increasing the current density was not considered.

Plating Rate High

Due to the high cathode efficiency of the bath, the plating rate is quite high. Actual determinations of the plating rate were limited to short times and fairly low current densities as the primary interest was in deposits of about 0.0001 in. thick. It was found, however, that this data and a few determinations for longer plating periods correlated rather well with rate data calculated on the basis of 100 pct cathode efficiency shown in Fig. 5, and a deposit composition of 75 pct Cd and 25 pct Sn. The data will assume a slight curve toward lower thicknesses with a change in deposit composition, but not to any great extent. The change in rate is negligible in thicknesses of 0.0001 in. There will also be a slight departure from linearity as the current density increases due to its effect on deposit composition (increase in tin content).

No information was obtained on the effect of temperature on the operation of the bath. A primary object of the investigation was to develop a process that would operate satisfactorily at room temperature. As this object was fulfilled,

no work was done on the effect of temperature.

Without the addition agents specified in the accompanying box, the deposit is dull and rather coarse grained. A great many substances were tried as addition agents, most of which had no effect. Only a certain type of colloidal suspension supplied the necessary action, and only a few materials of this nature gave success. The most successful were Processed Protein, produced by Canada Packers, Inc., and Petone, produced by Cudahy. These materials gave a bright, fine-grained deposit; treeing, which had caused considerable trouble earlier, was completely absent.

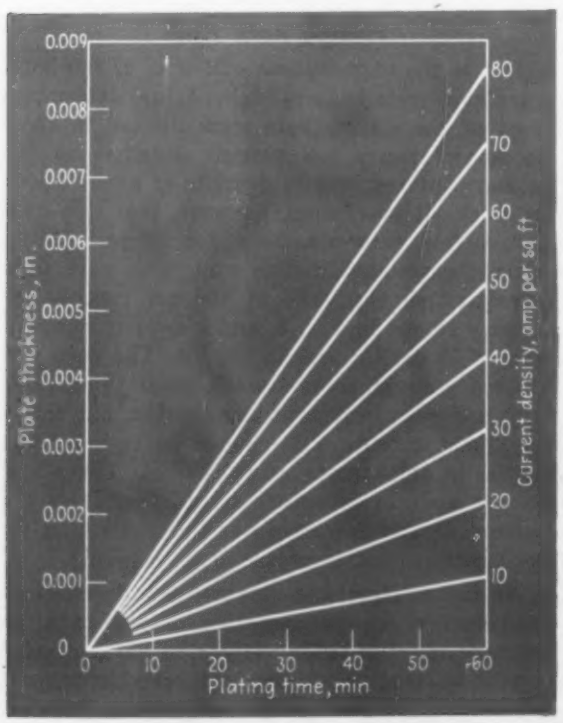
Occasional Filtering Required

On long-time operation of the bath, it was found necessary to filter occasionally for clarification. The proteinaceous addition agents are not too stable, and the bath becomes cloudy with time.

It is well to add about ½ per liter of the Processed Protein or Peptone prior to the clarification. This restores the bath to its original brightness.

During the course of the investigation, it was necessary to develop analytical procedures for control purposes; deposits from all of the experimental solutions were analyzed to determine their composition. These deposit analyses only involved the determination of tin. Cadmium was determined by difference. The deposit for analysis was usually plated upon stainless steel, from which the plate was easily lifted.

FIG. 5—Calculated plating rate data for the new method, based on 100 pct cathode efficiency and a deposit composition of 75 pct Cd and 25 pct Sn.



PLATING BATH COMPOSITION*

Cadmium Fluoborate (51.66 pct)	32 fl oz per gal
Stannous Fluoborate (43.50 pct)	9.3 fl oz per gal
Boric Acid	2.7 avdp oz per gal
Ammonium Fluoborate	6.7 avdp oz per gal
Fluoboric Acid (42 pct)	7.8 fl oz per gal
Phenol Sulfonic Acid (70 pct)	0.3 fl oz per gal
Processed Protein Powder	0.13 to 0.27 avdp oz per gal
Temperature	Room
Cathode Current Density	15 to 60 asf
Anodes	Individual tin and Cadmium (Ratio 3 Sn:1 Cd)
pH	2.5 to 3.0
Cathode and Anode Current Eff.	Approx 100 pct

*Cd-Sn fluoborate plating solution giving an average deposit of 75 pct Cd and 25 pct Sn.

Bath Is Strongly Acid

Since this plating bath is rather strongly acid (ph 2.5 to 3.0) which is typical of the fluoborate baths in general, it is necessary to use either glass or rubber-lined equipment to prevent bath contamination and equipment damage. Acid resistant masking materials for parts and racks are also required.

The aircraft engine parts were plated in a 10-gal tank that has been in intermittent operation for 18 months. Some bath decomposition was noted over this period, necessitating occasional replenishment of cadmium and tin in the solution. Slightly over a gallon each of stannous fluoborate concentrate and cadmium fluoborate concentrate have been added over this period. Deposit compositions have remained fairly consistent with 25 to 30 pct Sn and the remainder cadmium. Parts were plated in the tank operated as a still tank, while small parts were plated in a portable barrel which was inserted in the still tank; both still tank and barrel operations are therefore feasible.

The authors wish to thank W. Paecht and J. Debiec for their assistance in plating details and analytical work, and C. Struyk, General Chemical Co., for advice on fluoborate plating solutions.

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Effectiveness of single and multiple holes, axial and circumferential grooves in achieving stable lubrication compared.

JOURNAL BEARINGS LUBRICATION TESTED

FRICTIONAL heat and the stability of protective oil films in plain journal bearings can be largely controlled by the arrangement of oil holes and grooves, according to tests conducted by S. A. McKee and H. S. White of the National Bureau of Standards. Their investigation is part of a continuing research program on plain journal bearing lubrication sponsored by the National Advisory Committee for Aeronautics.

The tests revealed that it is always desirable to avoid oil holes or grooves which interfere with the normal development of hydrostatic pressure in the oil film supporting the load in the bearing. However, in bearing installations where the direction or intensity of the load is not constant, it is not always possible to satisfy this requirement. Even though the data collected by McKee and White is based on test runs in which the direction of loads was constant, the values obtained should be useful in estimating the effect of more complex operating conditions.

The friction-testing machine used for the investigation consisted of four similar test bearings enclosed in a housing and mounted on a common shaft. Frictional torque was measured by a dynamometer scale acting through a torque arm fitted to the housing. Test shafts were carburized steel, heat treated to hardnesses ranging from 55 to 61 Rc and ground to a surface roughness ranging from 4 to 5 microinches. The bearings used in the tests were made up of solid steel sleeves with copper-lead linings. The diameter of each test bearing was measured at the axial center and near each end. All four journals in each shaft were checked. Nominal dimensions were a shaft diameter of 2 in. and a 1¼-in. bear-

RATINGS OF BEARINGS

Design of Oil Feed	Bearing set	Friction Ratings: ZN/P=10 Δf	ZN/P=70 Δf	Average Δf for each set	Average Δf for each design	Rating	Load-Carrying Capacity Ratings: First Run: Critical ZN/P for each set	First Run: Average critical ZN/P for each design	Fourth Run: Critical ZN/P for each set	Fourth Run: Average critical ZN/P for each design	Rating
1 hole in bearing	31	0.00101	0.00149	0.00125	0.00130	A	3.2	3.2	1.7	1.6	A
	51	0.00106	0.00164	0.00135			3.1		1.5		
2 holes in bearing	32	0.00128	0.00187	0.00158	0.00147	B	3.5	3.5	2.6	2.7	B
	52	0.00113	0.00159	0.00136			3.6		2.8		
Axial groove in bearing	33	0.00101	0.00143	0.00122	0.00124	A	3.3	2.9	1.5	1.4	A
	53	0.00101	0.00149	0.00125			2.5		1.2		
4 holes in bearing	34	0.00125	0.00165	0.00145	0.00143	B	5.0	4.4	3.4	3.4	C
	54	0.00115	0.00166	0.00141			3.9		3.3		
Circum. groove in bearing	35	0.00186	0.00340	0.00263	0.00240	C	4.2	4.2	2.4	2.8	B
	55	0.00149	0.00284	0.00217			4.2		3.2		
1 hole in shaft	S31	0.00109	0.00166	0.00138	0.00136	A or B	2.2	2.6	1.8	1.8	A
	S51	0.00107	0.00162	0.00134			3.0		1.8		
2 holes in shaft	S32	0.00112	0.00169	0.00140	0.00143	B	2.7	2.8	2.0	1.9	A
	S52	0.00111	0.00181	0.00146			3.0		1.8		
1 hole with flat in shaft	S33	0.00137	0.00153	0.00145	0.00146	B	7.2	7.4	5.5	5.4	D
	S53	0.00126	0.00166	0.00146			7.7		5.2		

Values of the coefficient of friction, f, at ZN/P = 10 and ZN/P = 70 for each set of bearings tested are given in the friction ratings. The average value of f is given over this same range for each set and type of bearings. Critical values of ZN/P at which transition from stable to unstable lubrication occurred are given in the load-carrying capacity ratings.

ing length. With each oil feed arrangement, two sets of bearings of different clearances were used. These provided D/C ratios of 663 and 403, where D is the journal diameter and C is the diametral clearance. An SAE 20 motor oil was used in all tests at a constant oil inlet temperature of 200°F.

Constant Speed Held

The apparatus was warmed up before the start of each run and the data were obtained with the bearings at a steady rate of temperature distribution. With each set of bearings, tests were first made in the region of stable lubrication at the higher values of the generalized operating variable, ZN/P, where Z is the absolute viscosity of the lubricant, N is the speed of the shaft and P is the pressure on the projected area of the bearing. Each test run was made at a constant speed of 2030 rpm, with a number of constant loads which were successively increased at intervals during each run. Rate of oil flow was held at 15 cu in. per min, with the load on the shaft being increased until unstable lubrication developed. Because these operating conditions tended to change the condition of bearing surfaces, four consecutive runs under each given set of conditions were made with each set of bearings tested.

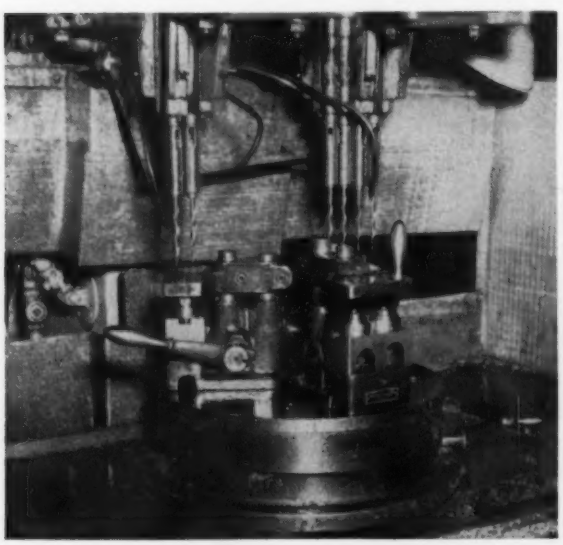
As each set of bearings was operated at each given load for two minutes, observations of the frictional torque were made at one-minute intervals. When stable lubrication had developed in the test runs, the second torque reading was either equal to or lower than the first. For this reason, all friction data appearing in the accompanying table was obtained from the first and fourth test runs. The values obtained from the last runs were used for rating the load-carrying capacity of the oil films developed.

The temperature rise that developed in the bearings during the test runs was dependent on both the heat generated in shearing the oil in the bearings and the heat delivered by the oil entering the bearings. Data obtained from the tests as a whole indicate that, under the specific conditions involved, heat-dissipation characteristics displayed were dependent chiefly on the rate of oil flow through the bearings. Neither the clearance in the individual bearings nor the type of hole or groove arrangement used had any appreciable effect.

Indexing fixture aids drilling close holes

PLATEN end plugs are machined for IBM electric typewriters at the International Business Machine Corporation's Poughkeepsie, N. Y. plant. Such parts each require four step-drilled holes which are too closely spaced in one direction for all four to be readily drilled at the same time.

For this reason, and to attain a good production rate, the illustrated indexing setup is employed. The indexing table carries three fixtures, each of which holds two workpieces. While each fixture is in the front position, two parts already drilled are removed and two undrilled parts are put in their place, after which the fixture is locked by a hand lever. This brings the combination clamp and bushing plate of the drill jig down against the top face of the two work pieces.



When this loaded fixture is indexed one station, it comes under four step drills that feed down and produce two holes in each piece. After the drills have retracted, the fixture indexes again and stops under a second set of four drills which are then in line with the remaining four holes in the jig. When these drills feed down, the four remaining holes, two in each piece, are produced. At the same time, a new pair of parts in the prior position are also drilled, hence eight holes are produced after each indexing.

With this setup, which works automatically except for loading and unloading; about 188 parts per hr are run. It is necessary to employ an 8-spindle drill press that can provide close center distances, or to use some equivalent setup that will operate two sets of four drills on the required centers.

Experiments on Forsterite Linings reported successful

According to this translation, the Germans have had good results with forsterite basic linings in induction furnaces. The raw material, Norwegian olivines, is plentiful and this practice may find wider use.

By B. M. PEARSON
Hassocks, Sussex, England

As a result of experimentation and actual production experience in German steel plants, a new basic refractory material has been developed from the mineral forsterite. This refractory brick has substantially increased the number of melts that were obtained from high frequency induction furnace linings. Only highly refractory materials can be considered for this service, and the rarer and more expensive linings must also be excluded.

The research that resulted in the forsterite, or magnesium orthosilicate (Mg_2SiO_4) lining, was conducted by Stuetzel during 1942 and 1943 in the research department of Friedrich Krupp, Essen. The aim of the work was to find a refractory lining that could be used in induction furnaces of more than one ton capacity, melting those steels for which acid linings are too strongly reducing. A means of extending the working life of such linings and providing greater security against break-outs was desired. Along with the investigations of forsterite, tests were also made of magnesia linings, with different additions and various particle sizes.

Forsterite, containing 57 pct MgO and 43 pct SiO_2, is the only highly refractory compound in the system MgO-SiO_2 that is free of transformation changes. In contrast, there are the well-known technical difficulties caused by quartz, the silica stones and zirconium oxide. The melting point of forsterite is 3434°F. With excess magnesia, the melting curve rises after it has passed over at 3362°F, the forsterite-periclase eutectic. An excess of SiO_2 causes the melting temperature to fall to 2809°F, the melting point of the eutectic of clinoenstat (this is the metasilicate $MgSiO_3$, containing 40 pct MgO and cristobalite SiO_2). With 45 pct MgO, the melting point is about 3092°F. The spalling tendencies of forsterite are not as pronounced as periclase. In this respect, forsterite resembles quartz.

As a lining material, this refractory is generally used in the massive form, and less often as a rammed mass. As far as is known, magnesium orthosilicate has never been used as a crucible lining for induction furnaces prior to the tests at Essen.[1] It was felt that it would be somewhat sensitive to slagging and iron oxides. Other quarters regarded the refractory as having satisfactory slag resistance. It does not appear, however, that forsterite can be considered as "the" basic lining. Such a basic lining—as satisfactory in every respect as the acid lining in its field—would not appear to be possible. Previous investigaions have shown that the reason for the basic behavior of forsterite is that its SiO_2 is firmly combined. Compared with the free silica of the quartzite linings, it is not reduced by the alloying metals of steels for which it is used. Accordingly, the steels themselves do not become contaminated with silicon and impoverished in manganese or chromium. In this respect, magnesium orthosilicate closely resembles magnesium oxide, and can replace this basic lining.

Other Basic Linings Limited

Other basic or basic to neutral linings offer great difficulties which can only be controlled by special measures or not at all. One of these refractories is magnesium oxide. While this material is completely basic, its tendency to crack when used in large crucible structures makes it one of the most undesirable types of linings. Other refractory compounds occupy an intermediate place in metallurgy and furnace operation.

Detailed information on the possibilities offered by these other materials and the difficulties involved in using them has been developed by W. Bottenberg and P. Bardenheuer[2] and by P. Bardenheuer and R. Bleckmann.[3] These investigations were confined to sinter magnesia and electro-magnesia. Spinel and forsterite were re-

garded as too little basic and too sensitive to temperature changes. Dolomite seemed too subject to weathering influences. Neither were alumina or corundum mentioned in this fundamental work, as they cannot be considered completely basic and possess insufficient resistance to temperature changes.

Special attention was paid to the slagging resistance of magnesite linings. After working with a reducing slag, it was established that destruction of the lining can only be prevented if penetrating slag can be removed immediately by some means. The particular disadvantages of magnesia linings, which are so favorable from the chemical-metallurgical aspects, are their sensitivity to temperature changes and thermal shock. Because of these characteristics there is always danger of break-throughs of molten steel to the water-cooled coils in induction furnaces.

One other material that is known to have particularly good resistance to thermal shock is the aluminum silicate mullite, $3Al_2O_3.2SiO_2$. As mullite is synthetically produced therefore it is not very economical. Like the silicate forsterite, $2MgO.SiO_2$, mullite can at least be characterized as having better resistance to thermal shock than many magnesite bricks.

Some Not Sufficiently Basic

If, as has been pointed out, corundum (Al_2O_3) and spinel ($MgO.Al_2O_3$) can be considered as not sufficiently basic, the same could also be said of silicate compounds containing 28 or even 40 pct of SiO_2. When used for melting chrome and manganese steels, these silicates might also react like acid linings.

Pure forsterite is seldom encountered as a natural mineral. However, there are the minerals called olivines, a close-mixed crystal series of forsterite and the corresponding iron orthosilicate known as fayalite (Fe_2SiO_4). These are not only encountered in nature as minerals, but even as massive rock formations, the peridotite, dunite or olivine rocks. Fortunately, these formations are usually rich in forsterite and are therefore refractory. Fayalite itself starts to melt at 2201°F, and a mixture of forsterite and about 15 pct fayalite commences to melt at 3092°F. For this reason, only those olivines with 10 pct or less of fayalite can be used for highly refractory linings. Olivine rocks always carry certain other additives which also reduce the melting point.

Rich amounts of olivine are often present in basic volcanic rocks such as the basalts, but they cannot be recovered. The earlier volcanic formations containing olivine are secondary in importance. Quantities are lower and are enclosed in lower melting basalt encrustations. Olivine rocks with the necessary low amounts of admixtures occur infrequently in Central Europe but are present in large amounts in South Norway. These deposits yield suitable forsterite. Formations have also been found in the Pyrenees, but they have yet to be evaluated.

How Forsterite Is Extracted

V. M. Goldschmidt[4], who worked on the Norwegian olivine rock and the Americans, R. E. Birch and F. A. Harvey[5], have described the method of extracting forsterite from this basic material. Magnesium oxide in the form of magnesia or sinter magnesite is added in such amounts to the crushed rock as to cause the decomposition of the fayalite content. The SiO_2 in this latter compound combines with MgO to form new forsterite, while the iron content forms a similarly refractory spinel magnesio-ferrite ($MgO.Fe_2O_3$), whose melting point is around 3272°F. The same reaction occurs with the chromite and magnetic iron ores, enstatite ($MgSiO_3$) and the magnesium hydrosilicates such as serpentine and talc, which are also present. Any excess of magnesium oxide remains as periclase.

It is also possible to process serpentine so as to form forsterite[6, 7]. Since it must first be kilned and undergoes considerable shrinkage during dehydration, it is preferable not to use this material.

Thermal shock tests of forsterite linings produced in this way have been performed. Bricks of the required shapes were prepared from a Norwegian olivine rock of the following composition: SiO_2, 40.7 pct; Al_2O_3, 0.7 pct; Fe_2O_3, 7.4 pct; CaO, 0.0 pct; MgO, 50.8 pct. The loss in weight on ignition was 0.36 pct.

The particle size was composed in agreement with recommendations by Goldschmitt[4]. These recommendations are for forsterite bricks having special resistance to thermal shock of 50 pct coarse olivine rock with a 3 to 1 mm particle size and 50 pct fine-grained material below 0.2 or 0.1 mm particle size, consisting half of olivine rock and half sinter-magnesite.

Handled Thirty-eight Melts

This lining was used in a one ton high frequency crucible, and thirty-eight melts, partly comprising hard manganese steels, were produced. This was the first of large scale tests conducted by M. Pohl. The crucible was very dense and tight, and was frequently allowed to cool during the tests. Unlike magnesite linings, it was noted that after melts were poured out there was no "after running" of the steel. The lining remained free of cracks and fissures.

Even in the hot condition the forsterite remained very elastic, because blows from pieces of scrap on charging did not damage it. A hole which developed during the thirty-sixth melt was successfully patched. In subsequent tests, patching had no apparent undue effects.

In general, the lining provided satisfactory

melting of steels which required a basic lining. A service life was established which could formerly only be achieved with a magnesia-zirconia composition. Accordingly, this expensive lining material may be replaced with forsterite. As for pure magnesite, the number of melts per lining was always considerably less.

Using laboratory samples of forsterite lining of the type just described, the following properties were established; density, 2.45; a slight after-expansion of about 0.1 pct, instead of the shrinkage that occurs with sinter magnesite; water absorption, 10 pct; apparent porosity, 25 pct. Thermal expansion was about 2.3 pct linear at 2822°F. This is similar to many magnesia samples, which generally show higher expansion rates. The heat conductivity of forsterite should be lower than with magnesite bricks.[5] In fact, forsterite appears to be less sintered though than is normal with magnesite linings. This has a lot to do with the greater sensitivity of magnesite to temperature changes.

It appears that the refractoriness of pure forsterite linings or those with a very small excess of magnesia is not always quite sufficient. At times, erosion occurs. This is due to certain constituents in the olivine rocks. The influence of these admixtures can be masked to a certain degree by a higher MgO addition, without endangering the inherent advantages of the forsterite lining.

Thermal Shock Tests Inconclusive

It must be emphasized that these thermal shock tests, like those made on standard-size, cylindrical test pieces, in no way give final evidence of the behavior of such linings in large-size crucibles such as high frequency induction furnaces. This is true both in the good and in the bad sense. As a matter of fact, the thermal shock test figures on individual test pieces were outstandingly bad. However, the differences between the demands made on samples in such limited tests and those made on complete linings in large crucibles are too great. Only extensive experience with crucibles of two tons capacity or more will permit sound estimates of a given type of basic lining. Forsterite has given good results when used to line a 2-ton crucible. The particle size was not entirely satisfactory, yet 14 melts were obtained with one lining and even with another. This second lining suffered premature destruction due to unfortunate circumstances. Sinter magnesite linings will not last through this many melts in the same type of furnace, even if special measures are taken. Usually, no more than 5 or 6 melts are obtained per lining.

Limited tests of forsterite in a 2.5 ton furnace by L. Luckemeyer-Hasse showed similar longevity. An average of twelve melts per lining was established, somewhat better than with magnesite linings under equivalent working conditions. In these tests, too, it was demonstrated again that forsterite linings do not crack or fissure, effectively minimizing the danger of breakouts.

This safety factor is the principal advantage of forsterite linings. It will continue to be so even when further experimentation and development provide greater durability.

It has also been shown that when certain percentages of the content of magnesite linings are forsterite they behave better than pure magnesite.[8] Therefore the excess olivine powder produced in crushing can be used as an up-grading constituent for magnesite. Similar mixtures in which ground scrap from forsterite crucible linings is present are significantly less inclined to cracking and fissuring, according to Luckemeyer-Hasse.

Quartz Can Be Substituted

Where olivine rock or fired serpentine is not available, magnesite linings can be given the advantage of forsteritic bonding by adding quartz, which opposes the spalling characteristics of the periclase grains. Preliminary investigations indicate that favorable results with such linings are completely possible. Such forsterite additions to magnesite have been studied by G. E. Seil[9]. Large-scale tests have not been undertaken.

Because of its dense structure, uncrushed olivine rock is quite resistant to slag attack, yet no precise information on rammed forsterite linings is available. There is one case where Stuetzel has reported that he observed a forsterite lining in prolonged contact with a lime-alumina slag. There was no ensuing damage.

Aside from the technical advantages afforded by forsterite, it is obvious that such linings will normally be somewhat cheaper than magnesite. One important economic advantage over sinter magnesite is that olivine rock, about two thirds of the lining mixture, requires no kilning.

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[8] *German patent: Friedrich Krupp, Essen; No. K 168, 373, Gr. Vla, Kl. 31a, 1943.*

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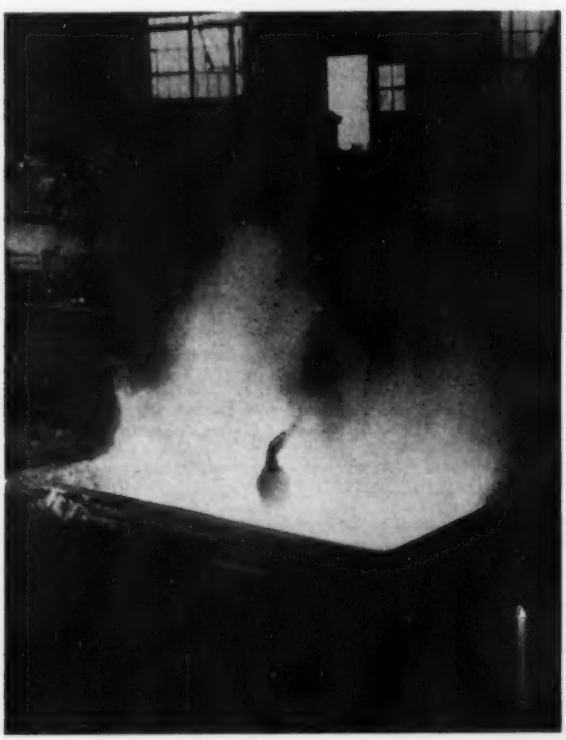
CAST STEEL SAFE DOORS and frames delivered to Advance Foundry for backing up with gray iron and copper.

Foundry pours burglar-proof doors

DOOR SHELL PREHEATING is accomplished with an oil torch after lining with a layer of scrap copper rods and before pouring a 10¼-in. layer of gray iron.



IN order to make them impervious to drills and blowtorches, three sets of cast steel safe doors and frames were delivered to Advance Foundry Co., Dayton, for backing up with copper and cast iron. Door shells, empty, weighed 10,100 lb. Frame shells weighed 8170 lb, see A.

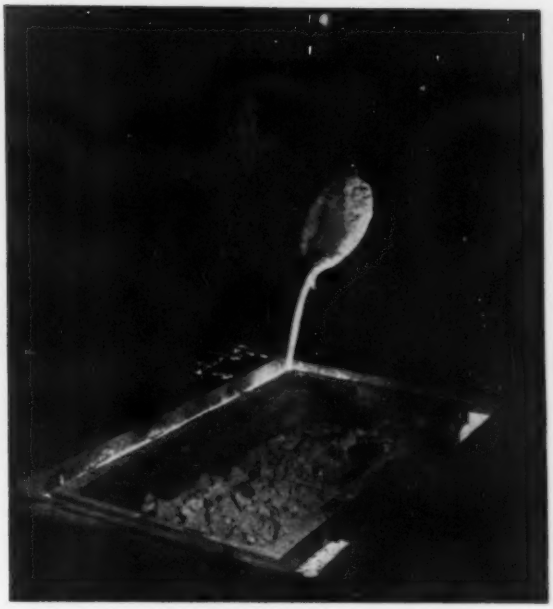
The first step in the backing operation was the placing of a layer of scrap copper rod in the shells of both the doors and frames. About 3500 lb of copper scrap was added to each door shell and about 875 lb to each frame shell. Next, both the shells and the scrap were preheated; the door shell with an oil torch, B, the frame shell by burning coke in the frame opening. Each unit was heated until the copper rods were glowing, C.

After heating, a 10¼-in. layer of gray iron, D, was poured over the copper rods. The cast gray iron layer in the door shell weighed 8800 lb; in the frame shell, 2200 lb.

Lastly, a 4-in. layer of cupola melted copper was poured over the layer of cast iron, E, into both the door and frame shells. Copper poured into the door weighed 5200 lb; into the frame, 2200 lb.

Final weights were: doors, 27,600 lb; frames. 13,445 lb. After proper finishing, these were sent to banks in California and Washington.

GLOWING COPPER RODS indicate that the door shell is ready to receive its layer of gray iron.



LIQUID GRAY IRON is poured into frame shell to a height of 10¼-in. Its weight is 2200 lb.

CUPOLA MELTED COPPER, poured over the gray iron layer in the door shell, finishes the job.

By L. SILVERMAN, *Chemist*
H. E. SCHWARTZ, *Chemist*
and B. CHALETT, *Metallurgist*
Eastern Smelting & Refining Co., Los Angeles

Rapid analysis

CUTS FURNACE HOLDING TIME

MANY smelters and foundries produce nonferrous alloys "tailor-made," crucible style, in 1000-lb heats. In the work process, the furnace is charged with suitable materials, melted and sampled. At this point, the melt must be maintained at high temperature while a chemical analysis is made. Any saving in time is important. Since a control method is required primarily to indicate whether or not the heat is within specification limits, a rapid, not a precision method, is quite adequate.

It was suggested previously[1] that the base metal of a nonferrous alloy could be run colorimetrically. A new type procedure was then developed for colorimetric control of the base metal of an alloy and its important components.

An appropriate example is the group of manganese bronzes, such as ASTM B-30-48, 7A, 8A, 8B and 8C, which contain copper, zinc, iron, aluminum and manganese as major constituents. The 110,000-psi tensile manganese bronze alloy specifies 60 to 68 pct Cu, 2 to 4 pct Fe, 4 to 7 pct Al and 2.5 to 4 pct Mn. Thus, if a furnace is charged with raw materials of estimated content, a rapid chemical check of copper, iron and manganese, together with a visual inspection of the ingot, assures that a satisfactory product will result.

In brief, the alloy is dissolved in hydrochloric acid and water. The color intensity is then measured by the photometer and the apparent copper content estimated from the calibration curve. An aliquot is used to determine the iron as thiocyanate. Necessary correction is made on the copper curve only if iron, nickel and tin are present in sufficient amount. Manganese may be determined colorimetrically[2] or volumetrically[3] on an aliquot. Aluminum could also be determined colorimetrically with aluminon.[4, 5, 6]

For determination of copper, first weigh 0.500 g of drillings and transfer the sample directly to a dry 100-ml pyrex volumetric flask. Measure in 5 ml of HCl (sp gr 1.2) and place the flask in a bath of cold water. From a pipette, add 5 ml of 30 pct H_2O_2, at such a rate that the action will not be too rapid, while shaking the flask. About 3 ml of peroxide are needed for complete solution (slag will not be attacked).

Bubbles Show Decomposition

When solution is complete, set the flask on a steambath or warmplate (60° to 80°C) to decompose any residual peroxide and to volatilize most of the chlorine gas. A change in the type of bubbles that appear at the surface indicates the complete decomposition of the peroxide.

Remove the flask from the heat and allow it to cool on the bench. Fill the volumetric flask nearly to the mark with conc HCl (this is done in the hood). Set the flask in a bath of water at room temperature. When the liquid is at room temperature, adjust to exact volume by adding conc HCl from a dropping bottle. Stopper and mix well. This is flask "A."

By pipette, withdraw 25 ml of the green solution from flask "A" and transfer to a 50-ml flask, flask "B." Dilute the concentrated acid solution in flask "B" with water, just short of the 50-ml mark. Mix and then set the flask in a bath of water at room temperature. When cool, adjust the solution to the mark using a dropping bottle of distilled water. Flask "B" is the working flask.

Prepare the photometer with a 650-millimicron (red) filter and adjust to "0" density (100 pct transmittancy) using water. Pour a portion of the green solution from flask "B" into a cuvette and read the color density for copper using the 650-millimicron filter. From the copper calibration curve, obtain pct Cu in the manganese bronze.

By pipette, withdraw 1 ml of the solution from flask "B" and transfer it to a 50-ml flask, flask "C." By pipette, add 2 ml HCl, then half-fill the flask with water and mix. By pipette, add 5 ml of a 25 pct NaSCN solution, dilute to the mark with water and mix well. Do not change

Rapid control analysis of furnace heats with the photometer reduces the length of time the heat must be maintained at high temperature. A new procedure was developed for colorimetric control of the base metal and important constituents of manganese bronze.

the order of additions. Let stand 2 min or more before reading.

Prepare the photometer with a 525-millimicron (green) filter and adjust to "0" density (100 pct transmittancy), using water. Pour a portion of the red solution from flask "C" into a cuvette and read the color density for iron, using the 525-millimicron filter. From the iron color calibration curve, obtain pct Fe in the manganese bronze.

Manganese Procedure

In the manganese procedure, a 0.1000-g sample should be used for 0 to 2.5 pct Mn, and 0.0500 g from 2.5 to 6.0 pct Mn. Weigh the sample and transfer it to a 250-ml volumetric flask. Add 20 ml of HNO_3 (1:1) and warm the flask until the sample decomposes. Remove the flask from the heat and allow to cool for several minutes on the bench. Add 10 ml of a 10 pct H_2 NSO_3H solution. Mix (the brown fumes will disappear). Cool the flask to room temperature in a bath of running water.

Add 0.10 g of sodium bismuthate to the flask and mix again. Dilute the flask to the mark with cold water. Mix. Filter off about 25 ml through a dry filter paper into a dry beaker. Discard this portion. Filter a second portion and use this for the photometric determination of manganese as permanganate. A 525-millimicron filter may be used. Obtain pct Mn from the curve.

To prepare the standard manganese solution, weigh 0.288 g of $KMnO_4$ and transfer to a 400-ml beaker. Add 10 ml of water, 1 g of Na_2 SO_3 and 5 ml of H_2SO_4. Boil for 5 min to expel excess SO_2. Cool the solution to room temperature and transfer to a 1-liter flask, dilute to the mark with water and mix well. 1 ml = 0.1 mg Mn. On a 0.1 gram sample, 1 ml is equivalent to 0.1 pct Mn, 5 ml are equivalent to 0.5 pct Mn, and so forth.

TABLE I

SAMPLES FOR COPPER CURVE

Flask No.	Cu, g	Zn, g	Cu, pct
0	0.000	0.50	0.0
1	0.100	0.40	20.0
2	0.200	0.30	40.0
3	0.280	0.22	56.0
4	0.300	0.20	60.0
5	0.320	0.18	64.0
6	0.340	0.16	68.0
7	0.370	0.13	74.0
8	0.400	0.10	80.0
9	0.450	0.05	90.0

TABLE II

SAMPLES FOR IRON CURVE

Flask No.	Cu, g	Zn, g	Fe, g	Fe, pct
0	0.320	0.18	0.0000	0.00
1	0.320	0.18	0.0025	0.50
2	0.320	0.18	0.0050	1.00
3	0.320	0.17	0.0100	2.00
4	0.320	0.17	0.0150	3.00
5	0.320	0.16	0.0200	4.00
6	0.320	0.16	0.0250	5.00

A set of 10 or more 100-ml volumetric flasks should be used in preparing the copper-color calibration curve. Each flask should be made up to contain 0.500 g of metal (copper plus zinc). Table I is an example.

Treat the flasks according to the procedure for copper. Plot the graph on regular coordinate paper using pct Cu as abscissa and color density as ordinate. The graph may be a straight line from 20 to 80 pct Cu, depending on the photometer.

Iron Determination

The iron color calibration curve is prepared with a set of seven or more 100-ml and 50-ml volumetric flasks. Each flask should be made up to contain 0.500 g of metal (copper plus zinc plus iron). Table II is an example. Treat the flasks according to the procedures for copper and iron, but read only the red thiocyanate solutions for the iron color calibration curve.

Plot the graph on regular coordinate paper using pct Fe as abscissa and color density as ordinate. The graph may be a straight line from 0.50 to 4.0 pct Fe. Prepare a set of seven 250-ml volumetric flasks for the manganese color calibration curves. Add 0.10 g of copper to each. Add to the seven respective flasks the following amounts of manganese solution: 0.0 ml (0.0 mg Mn); 1.0 ml (0.1 mg Mn); 5.0 ml (0.5 mg Mn); 10.0 ml (1.0 mg Mn); 15.0 ml (1.5 mg Mn); 20.0 ml (2.0 mg Mn); and 25.0 ml (2.5 mg Mn). This is for the 0 to 2.5 pct Mn series. A similar series for 2.5 to 6.0 pct Mn may be prepared by using just 0.050 g instead of 0.10 g of copper.

Treat the flasks as described in the procedure for manganese. From the data obtained plot color density as ordinate and plot mg Mn as abscissa; also, below mg Mn write in the equivalent pct Mn. Ordinary rectangular graph paper is used, since the color density values are logarithms of the pct transmittancy.

A copper sample of 0.500 g is convenient to weigh and the copper color will give a straight line graph for 20 to 80 pct Cu, which is well

within the manganese bronze range. Larger samples would give too dark a color when filter photometers are used, but are satisfactory with a Backman spectrophotometer. Smaller samples may be used, but are less representative.

The sample is transferred directly to a 100-ml volumetric flask. This saves a re-transfer later from a beaker to the eventual 100-ml volumetric flask. The volumetric flask may be warmed in hot water or heated to 80°C on a hot plate without breakage.

The H_2O_2-HCl mix is especially useful for dissolving manganese bronze. This combination is rapid in action, the excess peroxide decomposes to water and chlorine gas is expelled by warming. If a HNO_3-HCl mix were used, some HNO_3 would remain unless the solution is evaporated: if an $HClO_4$ mix were used, fuming would be necessary to volatilize the other reagent, and there would be difficulty with high manganese alloys. An H_2SO_4 mix was not considered feasible.

Acid Content Varies Color

Preliminary experiments showed that the color density of a copper chloride solution varied with the excess amount of acid present. Data for a series of samples containing 64 pct Cu in mixes of 60 pct, 50 pct, etc., to 0 pct of water (by volume) and the balance of HCl were examined (Table III). Small changes in pct H_2O had direct influence on the color density, except in the range of 0 to 10 pct H_2O, meaning 100 to 90 pct HCl. In other words, small changes or errors in acid and water content in the range of 0 to 10 pct H_2O would not affect the results. Unfortunately, working with conc HCl solutions is not desirable because of the corrosive fumes.

A second choice is 50 pct H_2O. Nearly maximum absorption occurred at this point, and this concentration of water-acid was selected. In order to assure reproducible acid-water concentrations, a prescribed volume of liquid from the solvent (100 pct HCl) flask is pipetted into a second flask (flask B) and mixed with an equal volume of water.

As was expected, the color intensity of the solutions is increased with higher temperatures. It is therefore advisable to work at room temperature, which means a bath of water should be available at all times. Corrections for extreme hot and cold day variations may be noted by running a standard sample (Bureau of Standards No. 62b) at the same time.

The procedure described does not use "pct transmittancy" values, but employs instead the logarithms of these numbers, called "color densities." There is a twofold advantage in this system. First, the graphs may be plotted on ordinary coordinate paper; second, positive or negative corrections because of unusual concentration of elements or because of poor cuvettes may be algebraically added to the readings.

TABLE III

EFFECT OF ACID—WATER CONTENT*

Water, Pct by Volume	Color Density Reading
65	60
55	62
45	63
35	62
25	61
15	60
10	60
5	60

* 64 pct Cu, 36 pct Zn.

Ni, Cr, Can Cause Error

The only innovation in the manganese procedure is the use of H_2NSO_3H. The acidity is figured to be 3 pct HNO_3 by volume and the amount of bismuthate used will be more than 25 times the maximum manganese content. The blue color of copper nitrate will be about the same intensity in all the test samples of ordinary manganese bronzes.

This rapid method for the photometric determination of copper in manganese bronze should not be extended to other copper-base alloys without specific investigation. The presence of zinc (0 to 35 pct), aluminum (0 to 10 pct), manganese (0 to 5 pct), nickel (0 to 1 pct) or tin (0 to 1 pct) does not affect the copper or iron determination. These elements may be present within the stated ranges and do not, individually, affect the copper or iron readings.

On the other hand, a nickel content of 1.5 pct or more will give low readings for copper, as will tin content greater than 2 pct. If such alloys are frequently encountered, it would be advisable to prepare synthetic samples and apply proper corrections. For these reasons the field of application of this method should be limited to experimental coverage. Unexpected elements such as cadmium, antimony, arsenic, phosphorus, sulfur and titanium should cause no difficulty when present in amounts of less than 0.10 pct. Chromium might cause error.

The authors wish to thank Robert Bernstein for his assistance in developing this procedure.

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news of industry

New Giant Presses Will Speed Plane Production

U. S. Air Force orders huge forging and extrusion presses as part of $200 million program . . . Time, labor, and material savings possible with new methods—*By Bill Olson.*

New York — Long-range planning by the U. S. Air Force and hydraulic engineers in developing the world's biggest forging and extrusion presses has given the aircraft industry a 2-year head start in the race to build aircraft for defense.

The Air Force recently announced it had contracted with Hydropress, Inc., for a forging press of more than 50,000 tons capacity and an extrusion press of more than 15,000 tons capacity.

It is believed the presses ordered are those described last May in a Munitions Board booklet, "The Production of Large Forgings for Airplanes on Hydraulic Die Forging Presses."

For further details on the hydraulic press program see The Iron Age, Nov. 2, 1950, p. 72.

The presses are two of 25 to be ordered under a $200 million hydraulic press program, and will be ready for use in 1952. They will probably be installed at the Air Force pilot plant in Adrian, Mich., where much of the experimental work has been done. New production methods will be made available to the Army, Navy, and industry.

Biggest die forging press to date has been the 33,000-ton job taken by Russia from Germany as a part of war reparations. The Russians are believed building a 55,000-ton press from parts taken from the Krupp Works at Essen.

Wing sections, now made from many parts riveted together, will be produced at one stroke of the press. Much riveting will be eliminated, and tremendous savings in manpower, machine time, and materials will be effected.

Boost Plane Payload

Aircraft payload and effective range will be increased. Higher yield strengths possible from forged parts will permit marked reductions in weight. Even greater strength will be possible by using blanks from the extrusion press.

The enormous die working area, about 16 ft by 46 ft, will permit larger, stronger, lighter parts which can be assembled with a minimum of joints.

Germany's leadership in development of hydraulic presses was forced on her. Cut off from steel sources after World War I, the Germans developed their abundant supplies of aluminum and magnesium.

The need for tremendous pressures required to work the light metals, and the lack of abundant cheap power, turned the Germans to heavy hydraulic presses.

As the need for economy of materials and more efficient fabricating methods became apparent in the U. S., a few far-sighted Air

Turn Page

Steel Capacity Growth

New York—Steel industry expansion in 1950 added 4,800,000 tons of new capacity and total steel output potential, effective Jan. 1, 1951, was at the record high of 104,229,650 ingot tons, said the American Iron and Steel Institute. Blast furnace capacity, also on the expansion road, rose to a peak 72,471,780, as compared to 71,497,540 tons Jan. 1, 1950.

George S. Rose, Institute secretary, said steelmakers 3 or 4 months ago reported programs for expanding capacity by more than 9 million tons and that the figure would be raised by at least 50 pct to bring annual capacity to at least 115 million tons by the close of '52.

From Refrigerators to Jet Parts

Chicago—The new $20 million refrigerator plant recently completed by Hotpoint, Inc., will produce major components and assemblies for the J-48 jet engine. The war contract, said to be one of the largest received by a manufacturer of consumer goods in the area, was made with the Pratt & Whitney Div. of United Aircraft, E. Hartford, Conn.

Paris Tool Exhibit Planned

Paris—The first European Machine Tool Exhibition, sponsored by the European Committee of Cooperation of Machine Tool Industries, will meet in Paris, Sept. 1 to Sept. 10. Machine tool manufacturers of Europe, Canada and the United States are expected to take part.

Force leaders and hydraulic engineers centered their attention on the vast savings in materials and time possible with big presses.

Impressed with German techniques, the Air Force embarked on a long-range program for development of hydraulic forging and extrusion presses. Material problems and existing transportation facilities apparently kept the size of the forging press to 75,000 tons.

Only one producer had facilities to make the huge castings and forgings necessary for such a press. A potential bottleneck was eliminated by using laminated steel plate in place of heavy castings.

Tie Rods 250 Tons

By making all tie rods and other major parts of forged and rolled slabs, a tie rod that weighed 250 tons was designed. The heaviest member of that tie rod weighs 25 tons, which could be obtained from at least eight steel plants.

The press platen will be pulled down and pushed up. Drive of the press is by air hydraulic accumulators serviced by four pumps of 1000 hp each; if operated directly off the pumps, 28,000 hp would be required.

A survey of strategic bombing effects showed the heavy castings on German presses stood up remarkably well, but controls and hydraulic systems were usually wrecked.

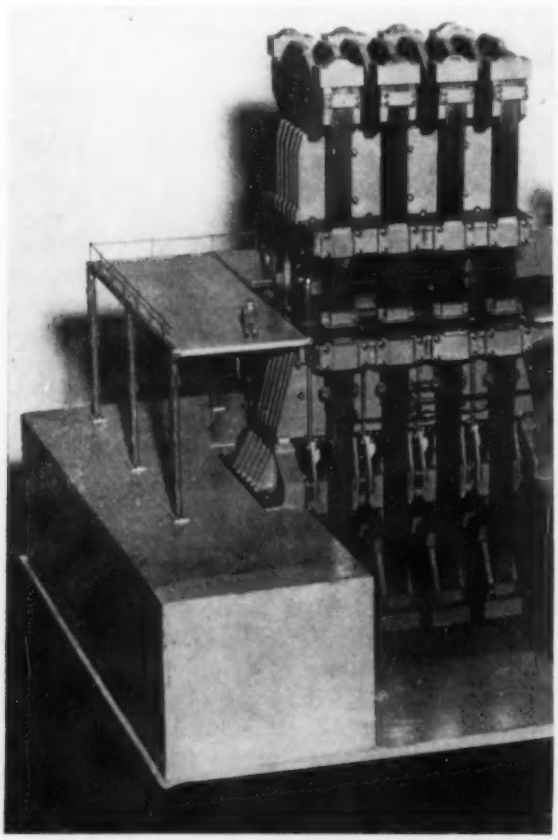
Vital Parts Underground

The press described has about 60 pct of its 102 ft overall height below the floor. Many controls and most of the hydraulic system would be protected from all but heaviest bombing.

The 11,000 ton dead weight would have to float on a "concrete barge," located in a special building. Estimated cost of the press, installed with auxiliary equipment, would range from $12 to $15 million.

Die costs frequently estimated to be higher for a heavy press than for conventional tooling, may actually be lower.

An aircraft stabilizer, formerly built from 547 different parts riveted together, could be built from 8 parts made on three dies. Total tooling cost would be about a third the cost of all jigs, fixtures, and gadgets used under the old method.



HUGE PRESS: Model view of new 75,000 ton hydraulic press shows relative size of operator compared to press. Large part of press will be below the floor safe from air attack. Laminated plate structure replaces huge castings usually used.

Canadians Feel Steel Supply Pinch; Many Shops Cut Operations

Ottawa—Canada's steel supply, becoming more critical daily, has caused many industries to curtail operations and in some cases to close temporarily. No large defense contracts using steel have been let. Industry is worried what will happen when Canada swings into full defense production schedules.

Kenneth Harris, steel administrator, says steel controls may widen as Canada converts to defense work. Maximum production and maximum supplies of steel are of prime concern, he said.

Production Doubled Since '39

Canada entered the last war with steel capacity well ahead of ordinary requirements. Today, Canada's steel capacity is being used to the full, and many consumers are unable to obtain supplies for current needs, even though Canadian steel production has almost doubled since 1939.

Leading steel producers have announced expansion plans or are proceeding with work of this nature. Canada's total rated capacity for steel production may be boosted by about 25 pct in 1951.

John Munson, U.S. Steel Raw Materials Officer, Retires

Pittsburgh—John G. Munson, since 1939 vice-president of raw materials for the now-merged U. S. Steel Corp. of Delaware, has retired and will serve in an advisory capacity for a time. As raw materials officer, he was instrumental in the discovery of Cerro Bolivar iron ore deposits in Venezuela and development of beneficiation for Minnesota taconite ores.

A 1905 Yale graduate, Mr. Munson was born in Bellefonte, Pa. His first job after graduation was as a rodman on tunnel construction but in a short time, from 1906 to 1908, he was superintendent of projects in New Haven, Conn., and Baltimore, Md. In 1909 he joined the J. G. White Engineering Corp. as construction superintendent

and later became operating manager of the Michigan Limestone and Chemical Co.

After the firm became a U. S. Steel subsidiary, he was made vice-president of Michigan Limestone and Bradley Transportation Co. in 1925. Mr. Munson was appointed president and director of both firms in 1928 and he became vice-president of U. S. Steel Corp. of Delaware in 1939.

Broader Steel Allocation, DO Extension Seen

Expect more allocations, DO extension late this month or early next . . . Petroleum industry first . . . To lift DO out of solely military . . . Rumor plans made—*By Gene Beaudet.*

Chicago—A government order calling for additional steel allocation programs and wider application of defense orders is expected at the end of this month or early February. Rumors resulting from a recent meeting of NPA's steel products advisory committee indicate plans for these programs and wider application of DO's have already been made. It is now up to the NPA steel task force committee to work out details of these projects when it meets later in January.

Out of Military Category

Present proposals are expected to lift DO's out of the strictly military category for the first time. They would be applied to construction of new plants, steel mill expansion and construction of facilities to safeguard public health, safety and other projects approved by the NPA.

Just how widely the DO's will be extended is not generally known, but if the plan is approved it will open the door to many more applications. It is said that these extended DO's may be applied against April steel production if the government can move quickly enough.

It is reported that an allocation program for the petroleum industry will soon be forthcoming. This is said to cover only oil country goods, with the tonnage set aside to be in the neighborhood of 1.9 million tons.

Steel requirements of the petroleum industry have been estimated at 12 million tons, so it is felt by steel and petroleum sources to be just a starter and that future allocations covering the rest of the industry will follow. Allocations for oil country goods were chosen first because they are hardest hit by the steel shortage.

Bite Into April Output

Another program of allocations expected to affect April steel production is one for the construction of 30 to 40 high speed merchant vessels which are needed quickly. Plate needed for construction of these ships is said to call for a wider and heavier plate around 1 in. thick. This will cause difficulty with those producers now rolling plate on strip mills.

Other reports state that some present programs will be cut down. Freight car allocations now running about 308,000 tons per month are expected to be reduced to 288,000 tons during the second quarter, according to informed sources. The diesel locomotive program planned to start in April will not get less than 70,000 tons per month during the second quarter as originally estimated.

Ford Orders 120 Gondola Cars

Greenville, Pa.—An order from the Ford Motor Co. for 120 special 70-ton all-steel mill type gondola cars, 40 ft in length, for handling hot billets was announced by the Greenville Steel Car Co.

Armor Plate Needed

Washington — The National Production Authority this week prepared to begin contacting steel firms which might be able to switch from some less essential types of production to output of armor plate. The action is held necessary, in addition to expanding present armor plate facilities, in view of the expected greatly stepped up need for defense.

Expansion of current capacity must begin immediately and NPA is taking steps which will assist in obtaining materials necessary for whatever conversion or construction is needed.

At the same time, a subcommittee of armor plate fabricators and finishers will begin setting up a program for obtaining and training manpower needed.

Contracts Top World War II Rate

Boston — New England's percentage of total national defense contract awards is topping the World War II rate for the first time since the Korean war opened and contract volume has doubled in the past month, reports the New England Council. A Council survey shows that during December contracts placed here were 10 pct over the national total.

NPA Order Cuts Firm's Output

Birmingham—Output of Stockham Valves and Fittings Co. will be slashed in half in the first quarter of 1951 because of government order NPA-M-12 which cuts brass use for non-defense purposes. Since the firm expects to be granted defense orders, no plans were made for cutting the work staff.

Gets Large Trailer Contract

Elba, Ala.—A $3 million U. S. contract for 747 heavy-duty flatbed trailers suitable for hauling heavy engineering equipment has gone to the Dorsey Trailer Co.

INDUSTRIAL SHORTS

INCREASING OUTPUT — The land, buildings and equipment of National Transit Pump & Machine Co., Oil City, Pa., has been acquired by the WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J. The plant will be utilized by Worthington to further its production of equipment related to the National Defense Program.

READY TO SERVE — The ALDEN EQUIPMENT CO., Los Angeles, has been formed and will represent the lines formerly handled by the Snyder Engineering Corp., including: Jeffrey Mfg. Co., Columbus, Ohio; Cleveland Worm & Gear Co., Cleveland; Farvel Corp., Cleveland; and Louden Machinery Co., Fairfield, Iowa. Snyder Engineering will continue with engineering, fabrication and construction activities.

NEW OPERATIONS — Plant No. 1 of the Pharis Tire & Rubber Co., Newark, Ohio, has been purchased by the WESTINGHOUSE ELECTRIC CORP. The plant will be converted and equipped to manufacture transmission units for Laundromat automatic washers.

CONSOLIDATES—A plant expansion and consolidation program of the ALFRED B. KING CO. with its subsidiaries, Churchward Welding Accessories and KIF Industrial Fabricators, was recently completed with the moving of these companies to their new 10,000 sq ft plant in North Haven, Conn.

BONDING PROCESS—A new method of bonding rubber to metal, called the Redux process, is described in the current issue of Rubber Developments issued by the NATURAL RUBBER BUREAU, Washington. The basic idea behind the procedure is to treat the rubber surface with concentrated sulfuric acid before bonding and then thoroughly washing in running water and drying.

BUILDING WAREHOUSE — Five acres of land in Baltimore has been purchased from the Baltimore & Ohio R. R. by the HILL-CHASE STEEL CO. OF MARYLAND for the erection of a new steel warehouse.

TAKES OVER — The JAMES CO., Seymour, Conn., manufacturers of chisels, bits and augers, has been purchased by John T. Doyle of Natick, Mass. The transfer includes the real estate, water rights on Little River and all the assets of the firm.

ACQUISITIONS — HAYES MFG. CORP., Grand Rapids, has acquired, for an undisclosed cash consideration, the substantial personal holdings of Allan P. Kirby, New York, in the Skyline Corp., Wichita, Kan., manufacturers of agricultural implements. Hayes has also purchased from Skyline, for cash, its 60 pct interest in Aircraft Armament, Inc., Baltimore, engineering firm specializing in aircraft armament and related equipment.

REORGANIZES—The Machinery Mfg. Co., Los Angeles, former builders of the Vernon line of jig borers, millers, shapers, and tool and cutter grinders, have reorganized under a new firm name, DIVERSIFIED METAL PRODUCTS CO. A development program is in process for precision machine tools.

MERGER — The Parker Plow Co., Richmond, Mich., has been merged with the DALZEN TOOL MFG. CO., Detroit. The former St. Clair Machine Products plant in St. Clair, Mich., will be reactivated into the Dalzen Mfg. Co. to make aircraft parts and heating equipment.

ADDS TWO BRANCHES — New branch offices at Denver and Houston have been opened by the HOWE SCALE CO., Rutland, Vt. Daniel O. Ferris and Henry K. Leonard are managers of the Denver and Houston offices respectively.

Truman's State of Economy Speech Puts the Stress on Output

Washington—While the President's annual economic message indicated an increasingly austere economy in 1951, Mr. Truman emphasized the need for greater production.

Expanded production will not only provide for national defense, said Mr. Truman, but will also assure the maintenance of a strong economic base despite cutbacks in the output of civilian goods.

Emphasis on Output

A maximum production effort in 1951 should bring an "annual rate of output of about $310 billion at 1950 prices" by the end of 1951, said the President. National security costs were estimated at a rate of $45 to $55 billion by the end of 1951, although future commitments will raise these costs to more than $140 billion for the fiscal years 1951 and 1953. These costs are now taking about 7 pct of national output and will increase to about 18 pct by next year, as compared with about 45 pct during the peak of World War II.

For the steel industry he called for an increase in capacity from the present 103 million tons to about 120 million tons within the next few years. The President warned that expansion of essential civilian production would mean a "much greater diversion from ordinary civilian uses." He also stressed the need for more Great Lakes ore boats and an expansion in iron ore supplies, including those in Venezuela and the Labrador-Quebec area, as well as a step-up in beneficiation of low-grade domestic ores.

Congress was also urged to authorize an immediate start on the St. Lawrence as an important artery for the transportation of iron ore and to increase the supply of power in the northeastern states. The nation's power facilities must be expanded by more than 20 million kw in the next 3 years, stated Mr. Truman.

New Zirconia Refractory Withstands 4600° F

Material has low rate of heat conductivity, high resistance to thermal shock . . . Finds wide use in chemical, petroleum and metalworking fields—*By Jack Kolb.*

Worcester, Mass.—A new refractory, fused stabilized zirconia, can withstand temperatures up to 4600°F as compared to super-duty fireclay, used up to 3100F°, and alumina brick, up to 3400°F. This zirconium dioxide product will be sold in bulk or molded shapes on a full commercial basis by Norton Co., here.

Large-Scale Uses

At present, few completely developed applications of the new refractory have been established, although a large number of experimental and pilot-plant test programs are under way in chemical, petroleum, metalworking and other industries.

Among present large-scale uses are setter plates for firing titanates in the electronic equipment field, furnace lining bricks for gas synthesis at high temperatures, and heating elements and insulation for large furnaces.

Demonstrations of this latter use at the Worcester, Mass., plant of the Norton Co. revealed some interesting possibilities. Laboratory-scale induction and resistance furnaces fitted with zirconia inner walls, bottoms and tops that also serve as the unit's heating elements, were operated at about 3600°F and 4000°F, respectively.

Low Rate of Heat

The induction furnace had an air atmosphere, while the resistance furnace was charged with hydrogen. Both must be preheated, as zirconia becomes a good conductor of electricity only at elevated temperatures.

Zirconia was used in brick, disc, tubular and granular form in these furnaces. Despite its high density, the new refractory material has a very low rate of heat conductivity and excellent resistance to thermal shock. It has exhibited low reactivity and is not subject to volatilization in either reducing or oxidizing atmospheres.

A large part of the reason for Norton's success in developing the new zirconium oxide refractory is the electric fusion process used to refine the ore. This is zircon sand, found in Australia and Florida, containing 33 pct silica. One furnace firing suffices to lower the silica content to ½ pct or lower. The principal stabilizing agent in the new refractory is lime.

Archibald H. Ballard, associate director of research and development at Norton, has stated that the basic problem still to be solved is improving manufacturing techniques for molding shapes and lowering the cost of manufacture.

A zirconia brick, 9½ x 4½ x 2½ in., weighs 16 pounds, almost twice as heavy as super-duty fireclay shapes of the same size. The zirconia brick costs 10 to 12 times more. Its insulating value, greater than all other commercial refractories, should offset this differential somewhat by making possible thinner wall construction. Expected improvements in service life should also improve the new refractory material's cost relationship.

New England Mill Start Seen in Six Months

Fast tax writeoff OK makes New England mill fairly certain . . . Will turn out about million tons of flat-rolled products . . . RFC loan will be made if it is needed—*By Bill Packard.*

New York—Government approval of the New England Steel Mill Development Corp.'s application for a certificate of necessity practically assures that a large integrated steel mill will be built near New London, Conn.

The mill will be able to turn out about a million tons of flat-rolled products annually. Construction, which will cost about $250 million, is expected to start in about 6 months.

Although details of financing, engineering and operation are not yet final, they should be completed within the next 30 days.

RFC Loan—If Needed

Backers of the project stressed that participation by an existing steel company was still open, but that the project would be pushed ahead regardless of the outcome of negotiations.

Approval of the certificate of necessity classifies the plant as necessary for defense and permits tax benefits in the form of 5-year amortization. It also clears the way for a loan from RFC.

New England insurance companies are ready to loan $120 million of the $250 million total cost. Another $40 million in equity capital is expected to be raised through New York bankers. This leaves $90 million to be raised by the participating steel company, or through a loan by a defense agency if a new corporation is formed to run the plant.

Most of the plant site is now owned by Connecticut, and the remaining land needed will be obtained through the state's power of eminent domain.

This is the third large new integrated steel mill to be approved for the East Coast area within recent weeks. The other two mills are to be built on the Delaware River below Philadelphia by U. S. Steel Co. and National Steel.

Anti-Inflation Camp—Allies in Discord

All factions plan strategy likely to hurt them least . . . ESA's Valentine reluctant to enter quickly into general price-wage controls . . . Auto rises probable—*By Ted Metaxas.*

New York—Washington, labor, and management are self-declared champions in the crusade against inflation—but they are allies in discord, divided even amongst themselves. All factions are advocating strategy that will injure them the least. It has developed into the campaign of the selfish motive.

When ESA clamped mandatory controls on auto prices, it was thought that it was unlimbering heavy guns. But Valentine feels that the time is not yet opportune for sweeping price and wage controls and last week auto men and John Hancock, assigned by DiSalle, discussed a formula for raising auto prices.

Lewis Stresses Output

Thus the call for a Dec. 1 rollback of prices becomes a terribly confused affair with some manufacturers responding, others not. It is paring away the profits of some and permitting others the same gravy.

With a 3¢ to 5¢ cost-of-living wage adjustment due for Detroit auto workers by Mar. 1, ESA determination to control prices would justifiably have obviated all escalator clauses in union contracts. But now that probable quarterly auto price hikes would be permitted, escalator clauses seem to have a new lease on life.

UMW's John L. Lewis, one of the crusaders against inflation, at Washington Wage Stabilization Board meetings last week eloquently stated that the increased production of "free men" would offset the inflationary trend and thus direct controls of any kind would be unneeded.

Other unions are ostensibly bitter enemies of inflation—as long as it doesn't come out of their pocket. They point to "huge" corporation profits and encourage the government to cut inflation at the expense of private enterprise. They urge retention of escalator clauses on the grounds that they will be meaningless anyway in a full price freeze that will not permit the cost-of-living index to advance.

The President's Council of Economic Advisers has declared against escalator clauses in a war-tempo economy. ESA is shying away from price controls on meat, food and other staples. Without these wage controls are difficult.

Former NAM president Ira Mosher told WSB last week that he was opposed to direct price-wage controls until all indirect steps prove fruitless. He said his group was divided on escalator clauses but that the clauses should be permitted unless they conflict with national wage policy. Also in Washington last week, officials of the dress industry uttered a unanimous, whole-hearted cry for a price chill.

Meanwhile ESA is trying to take the edge off inflation by controlling prices of raw materials. It is now working on scrap steel and iron with industry cooperation and some sort of mandatory controls may evolve. Under ESA discussion last week were price controls for the ferroalloy industry with tool steel men yelling for "immediate controls." Government officials said soothingly that the tool steel high price situation was "complicated chiefly by recent sharp rises in the price of imported tungsten."

"We got a defense order so we had to expand."

Urges Holding Skilled Labor

Boston—Firms outside the New England industrial area are trying to lure away skilled workers and technicians with newspaper advertising and recruiting campaigns conducted by agents, said Walker Mason, newly-appointed chairman of the Industrial Committee of the New England Council.

He warned local industry to hold onto skilled help because defense contracts and subcontracting work would develop an urgent need for skilled labor.

Ford Postpones Construction

Detroit—Henry Ford II's decision to delay indefinitely construction of a Dearborn administrative wing is based on his belief that critical materials should not be used by the Ford Motor Co. for office buildings "when the nation needs weapons and materials to produce them." Ford had planned an 11-story structure for staff offices and a 6-story headquarters building for Lincoln-Mercury Div.

To Raise Electroshield Output

Carnegie, Pa.—Because of heavier demand for Electroshield metal sheets, a cladmetal of rolled copper bonded to a base sheet of magnetic low-carbon steel, American Cladmetals Co. is increasing production facilities. The company reports that Electroshield cuts copper use and is stronger than copper sheets.

More Scrap for More Steel for Defense

Scrap Institute holds 23rd annual convention in New York . . . Shop talk focus on defense and price controls . . . Many think best way to bring out scrap is unhindered market.

New York—Free enterprise in its healthiest form is still on the prowl. Anyone doubting this could have seen it for himself had he visited the 23rd annual convention of the Institute of Scrap Iron & Steel at the Commodore Hotel here the first 3 days of this week.

Corridor talk centered on price controls, inventory controls and other government regulations, as well as the defense effort and its effect on the already terrific demand for metal.

The usual buttonhole confererences on deals, grading, etc., came in for plenty of attention between sessions. But these were tempered a bit this year by the sure knowledge that the long hand of controls was reaching in the direction of their industry.

Privately, many scrap people are convinced that the best way to meet the unprecedented demand of hungry steel furnaces is by permitting free action of supply and demand through a free market. They believe that the best way to bring out the needed scrap metal is to pay the price. But they have also read the writing on the walls in Washington and it spells C O N-T R O L S.

Institute members came to the convention flushed from a record-breaking year in 1950. A total of 61 million gross tons of iron and steel scrap was consumed by steel mills and foundries in the U. S. last year, reported Ed Barringer, executive secretary. This was 20 pct greater than in 1949 and 5 pct above the previous peak year of 1948.

Consumption of close to 30 million tons of purchased scrap last year also topped the previous record of 29 million tons. Current rate of consumption is 32.5 million tons annually, and by the end of 1952 the annual requirement will be at least 35 million tons of purchased scrap, Mr. Barringer declared.

The opening session Sunday morning was a workshop for officers of local and regional chapters. This was followed by a meeting of the national board of directors in the afternoon.

Stanley M. Kaplan, president, and Herman D. Moskowitz of the Institute's Defense Advisory Committee, spoke on the relation of scrap iron and steel to the mobilization for national defense at the Monday morning session.

Major Alexander P. de Seversky, outstanding authority on aviation, was the principal speaker at the annual banquet Monday evening. He gave his views on how and where to apply our nation's strength so that we can maintain peace.

An unusual feature of the convention was an exhibit of machinery and equipment used in the scrap industry. This was of great interest to the many members who see increased mechanization as one of the best ways to help cut costs and meet the terrific demand for scrap.

DO's for Equipment Accessories

Washington — Under Amendment 3 to Reg. 2, DO ratings may be extended to obtain certain accessories for production equipment. However, ratings may be extended o n l y for accessories needed for actual production of defense equipment. This does not include machine tools or other complete u n i t s of production equipment.

Specifically, ratings may be used for procurement of jigs, dies, tools and fixtures where inability to obtain these items would delay filling of defense orders. In the meantime, NPA is working out an assistance program for MOS (maintenance, repair and operations) needs.

Lewis Foundry to Expand

Pittsburgh—The Lewis Foundry & Machine Div. of Blaw-Knox Co. is moving ahead with a $1 million expansion and improvement program to help meet growing demand for rolling mill machinery.

The program will include plant changes and addition of new equipment to handle heavier types of rolling mill machinery, as well as increase overall capacity. Orders for machine tools have already been placed.

British Shipbuilding Stimulated

London — Britain's shipyards opened 1951 with nearly $850 million worth of orders, resulting from bookings during 1950 that were three times those of 1949.

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Jan. 15, 1951

Item	Quan.	Value	Company
Drills	521	$ 214,652.00	Chicago Pneu. Tool, Chicago
Power unit	25	174,900.00	Pioneer Eng. Wk., Minneapolis
Radiosonde	75,000	3,041,250.00	Johnson Service Co., Milwaukee
Radio equipment	Various	11,485,239.00	Federal Tel. & Radio Corp., Clifton
Radio set	.....	1,732,291.00	The Lewyt Corp., Brooklyn
Dishwashing machine	365	717,033.25	Peters-Dalton Inc., Detroit
Teletype, model 14	144	100,000.00	Teletype Corp., Chicago
Radio set	591	600,000.00	Hoffman Radio Corp., Los Angeles
Vapor compressors	200	700,000.00	Cleveland Diesel Engine div. of GMC, Cleveland
Receiving set	381	405,600.00	Air Associates, Inc., Teterboro
Aircraft engine	178	398,250.00	Central Bank of Oakland, Oakland
Shock absorber	2,000	104,200.00	Delco Products Div.
Starter	5,245	209,312.70	Diamond T Motor Car Co., Chicago

U. N. Coal Committee Moves To Offset Coke, Coal Shortage

London—To offset serious coke and coal shortages in importing European countries, 18 nations in the coal committee of the United Nations Economic Commission for Europe have agreed on a pattern of trade.

The committee drew up a blueprint of supplies for importing countries covering 10.5 million tons of coal and 3 million tons of metallurgical and domestic coke for the coming 3 months of this year.

Total coal and coke import needs were estimated at nearly 19.5 million tons for the first quarter, while export possibilities revealed a deficit of almost 5 million tons of coal and about 1 million tons of coke.

The committee urged increased production and increased exports and economy of use. Britain's coal situation is grave. Coal production has not measured up to needs and inclement weather now is biting deep into below - average stocks.

Britain Starts Drive for Scrap

London—Some capacity in the iron and steel industry of Britain remains unused because raw materials supplies are tight. Greater scrap collections can solve part of this problem and thus the Iron and Steel Federation, the Joint Iron Council, and the National Federation of Scrap Iron, Steel, and Metal Merchants are pushing a drive for larger amounts of scrap. Letters have been sent to 15,000 iron and steel users in this country, pointing out that each extra ton of scrap means an extra ton of steel.

French Plate Mills to Expand Plate Output under Marshall Plan

Washington — Steel plate production, an essential part of France's rearmament, will be increased under two Marshall Plan projects.

The projects call for modernization and expansion of a plate and slab mill at Dillegen in the Saar, and a plate mill at Mont-Saint-Martin. Total cost is estimated at $14,640,000, one-third to be financed by the Marshall Plan.

Present French plate capacity is about 800,000 tons. This should rise to between 1,000,000 and 1,100,000 tons per year, it is reliably reported.

Completion of the two projects should take 2 years. Both plants were rehabilitated after World War II, but much essential equipment is obsolete.

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated Weekly Production (Net Tons)	Number of Weeks in Month
	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity		
January, 1950	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
February	6,142,178	92.0	255,565	60.2	395,502	75.0	6,793,245	89.1	1,698,311	4.00
March	6,747,680	91.3	265,726	56.5	473,630	81.1	7,487,036	88.7	1,690,076	4.43
1st Quarter	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
April	7,314,733	102.2	407,909	89.5	490,030	86.7	8,212,672	100.4	1,914,376	4.29
May	7,597,837	102.8	437,006	92.9	517,044	88.6	8,551,887	101.3	1,930,449	4.43
June	7,218,570	100.9	406,944	89.3	506,001	89.5	8,131,515	99.4	1,895,458	4.29
2nd Quarter	22,131,140	102.0	1,251,859	90.6	1,513,075	88.2	24,896,074	100.4	1,913,611	13.01
1st 6 Months	42,152,517	97.7	2,152,402	78.3	2,801,808	82.2	47,106,727	95.5	1,820,902	25.87
July	7,220,214	96.9	380,317	79.8	470,763	78.4	8,071,294	94.7	1,826,085	4.42
August	7,315,215	98.0	405,118	84.8	509,684	84.7	8,230,317	96.3	1,857,859	4.43
September	7,258,961	100.7	409,216	88.7	525,017	90.3	8,193,194	99.3	1,914,298	4.28
3rd Quarter	21,794,390	98.5	1,194,651	84.4	1,505,764	84.4	24,494,805	96.7	1,865,560	13.13
9 months	63,946,907	98.0	3,347,053	80.4	4,307,572	82.9	71,601,532	95.9	1,835,937	39.00
October	7,731,280	103.6	436,635	91.5	571,980	95.0	8,740,095	102.3	1,972,933	4.43
*November	7,108,810	98.3	370,659	80.1	532,382	91.3	8,011,851	96.8	1,867,564	4.29
†December	7,438,703	99.9	380,011	79.8	541,084	90.1	8,359,798	98.1	1,891,357	4.42
†4th Quarter	22,278,793	100.6	1,187,505	83.8	1,645,446	92.2	25,111,744	99.1	1,911,092	13.14
†2nd 6 months	44,073,183	99.6	2,382,156	84.1	3,151,210	88.3	49,606,549	97.9	1,888,335	26.27
†Total	86,225,700	98.6	4,534,558	81.3	5,953,018	85.3	96,713,276	96.7	1,854,877	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,668,287 net tons open hearth, 106,195 net tons Bessemer and 131,788 net tons electric ingots and steel for castings, total, 1,906,268 net tons; based on annual capacities as of January 1, 1950, as follows: Open hearth 86,984,490 net tons, Bessemer 5,537,000 net tons, Electric 6,871,310 net tons, total 99,392,800 net tons. Beginning July 1, 1950, the percentages of capacity operated are calculated on weekly capacities of 1,685,059 net tons open hearth, 107,806 net tons Bessemer and 135,856 net tons electric ingots and steel for castings, total 1,928,721 net tons; based on annual capacities as of July 1, 1950, as follows: Open hearth 87,858,990 net tons, Bessemer 5,621,000 net tons, Electric 7,083,510 net tons, total 100,563,500 net tons.

* Revised.

† Preliminary figures, subject to revision.

January, 1949	7,289,865	101.2	408,552	92.6	498,973	96.1	8,197,390	100.4	1,850,427	4.43
February	6,635,765	102.0	379,696	95.3	478,479	102.0	7,493,942	101.6	1,873,485	4.00
March	7,476,139	103.7	430,176	97.5	495,481	95.4	8,401,796	102.9	1,896,568	4.43
1st Quarter	21,401,789	102.3	1,218,426	95.2	1,472,933	97.7	24,093,128	101.6	1,873,494	12.86
April	7,017,712	100.6	404,095	94.6	374,358	74.4	7,796,165	98.6	1,817,288	4.29
May	6,891,293	95.6	400,741	90.9	306,956	59.1	7,598,990	93.0	1,715,348	4.43
June	5,956,402	85.4	349,196	81.8	199,058	39.6	6,504,656	82.2	1,516,237	4.29
2nd Quarter	19,865,407	93.9	1,154,032	89.1	880,372	57.7	21,899,811	91.3	1,683,306	13.01
1st 6 months	41,267,176	98.1	2,372,458	92.1	2,353,305	77.6	45,992,939	96.4	1,777,848	25.87
July	5,309,060	73.6	309,236	68.2	175,535	33.9	5,784,831	71.0	1,308,785	4.42
August	6,103,326	84.7	355,335	80.6	264,110	50.9	6,722,771	82.3	1,517,556	4.43
September	5,994,100	86.1	350,282	82.2	253,553	50.5	6,597,935	83.6	1,541,574	4.28
3rd Quarter	17,406,486	81.5	1,005,853	76.9	693,198	45.0	19,105,537	78.9	1,455,106	13.13
9 months	58,673,662	92.5	3,378,311	87.0	3,046,503	66.6	65,098,476	90.5	1,669,192	39.00
October	814,618	11.3	.....	.....	113,729	21.9	928,347	11.4	209,559	4.43
November	3,806,870	54.6	172,270	40.3	243,989	48.5	4,223,129	53.4	984,412	4.29
December	6,953,653	96.7	396,075	90.0	378,496	73.0	7,728,224	94.8	1,748,467	4.42
4th Quarter	11,575,141	54.2	568,345	43.4	736,214	47.8	12,879,700	53.2	980,190	13.14
2nd 6 months	26,981,627	67.8	1,574,198	60.2	1,429,412	46.4	31,985,237	66.0	1,217,558	26.27
Total	70,248,803	82.8	3,946,656	76.0	3,782,717	61.9	77,978,176	81.1	1,495,554	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons Bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of January 1, 1949 as follows: Open hearth 84,617,040 net tons, Bessemer 5,191,000 net tons, Electric 6,112,890 net tons, total 96,120,930 net tons.

ESA Hopes to Have Regional Field Offices Open This Month

Washington — The operational framework of the price control organization is slowly taking shape. The Economic Stabilization Agency has picked locations for its regional field offices. Administrative officials are to be dispatched to these cities at once and ESA hopes to have most of them open by the end of January.

Location of Headquarters

Regional headquarters will be established at Boston (for Me., N. H., Vt., Mass., Conn., and R. I.), New York City (N. Y. and N. J), Philadelphia (Pa. and Del.), Richmond (Va., W. Va., Md., D. C., and N. C.), Atlanta (Ga., Tenn., S. C., Ala., Miss., and Fla.), Cleveland (Ohio, Mich., Ky.), Chicago (Ill., Wis., Ind.), Minneapolis (Minn., N. Dak., S. Dak., and Mont.), Kansas City (Mo., Ia., Neb., Kans.), Dallas (Tex., Okla., Ark., La.), Denver (Colo., Wyo., Utah, N. Mex.), San Francisco (Calif., Nev., Ariz.), and Seattle (Wash., Ore., Idaho).

In addition to these 13 regional offices, whose work will be largely administrative, the ESA plans to set up two branch headquarters, one each in Los Angeles and Detroit.

Regional offices will boss numerous district offices which will actually handle controls on the local levels. The total and locations for district offices are still on paper and cannot be set up until regional offices are established.

Expect Freight Car Increase

Washington—Deliveries of new domestic freight cars are expected to rise gradually in the first quarter of 1951 and possibly reach the 10,000 level goal by April or May, said the American Railway Car Institute and the Assn. of American Railroads. The largest number of new cars since 1922 was ordered last year. Total was 156,481 and deliveries were 43,991.

Chrysler Unveils 5 Major Developments

Engineering innovations include engine, brakes, steering, shock absorbers and torque converter . . . High compression engine uses standard gasoline—*By Walter G. Patton.*

Detroit — Chrysler engineering hit the jackpot in Detroit this week with the simultaneous announcement of five major engineering changes to be incorporated in its 1951 models. These advances include (1) a new 180 hp V-8 engine operating at 7.5 to 1 compression ratio on standard fuel, (2) power steering for passenger cars, (3) air-cooled brakes, (4) improved shock absorbers and (5) a new torque-converter type automatic transmission.

The new Chrysler engine is undoubtedly the most important contribution by Chrysler engineering in the postwar period. The new high compression type powerplant represents a somewhat different approach to the automotive engine problem although the principle of a hemisphere combustion chamber, spark plug located in the center and large valves has been utilized in aircraft engines and racing cars.

High Compression Engine

Design of the combustion chamber, coupled with a more adequate spark and larger valves permits the Chrysler engine to operate at 7.5 to 1 compression ratio on *standard fuel.* Chrysler design makes possible more efficient operation of a passenger car engine without requiring higher octane fuels. It is also believed that Chrysler can go to comparatively higher compression ratios with fewer engineering changes than will be required in the GM-type engines.

With only 2.3 pct more displacement, the new Chrysler engine achieves 33 pct greater hp. Maximum torque has been increased to 16 pct compared with the 1950 8-cylinder in-line engine. According to Chrysler engineers, the new design gives the highest output per cu in. of any engine in the industry today. The 180 hp rating is also the highest in the industry.

Power steering for passenger cars, developed by Gemmer Mfg. Co., Detroit, will be introduced first by Chrysler. Other auto makers are known to be interested in this development.

Hydraulic Power Steering

Power steering requires only about a tenth the physical effort previously necessary. The steering wheel can be guided using the pressure of only one finger and guidance with the thumb. This is made possible by the use of a hydraulic mechanism to do the work. Steering wheel travel has been reduced from five and a half to three and a half turns for complete travel of the wheel.

Chrysler's new Oriflow shock absorbers are also an advanced design. More precise control of the fluid flow in the shock absorber, it is claimed, makes possible a gradual change of resistance during jounce and rebound after severe spring deflection.

The new anti-shock devices have ten fewer parts than the previous designs. They are said to be less expensive than previous types to manufacture and are reported to give longer life than other designs.

Chrysler is introducing forced air cooling of its disc type brakes on all 1951 Imperial models. Forced air cooling is claimed to reduce (1) internal brake temperatures up to 35 pct and (2) brake lining wear up to 50 pct. Because of a cooler brake, more braking effort can be used in making highspeed stops, it is contended. The new brakes have blades on the wheel discs which pull air over the housing while the wheels are turning.

Details of the new Chrysler automatic transmission are not yet available. Essentially, Chrysler is substituting a torque converter for the fluid coupling ahead of its automatic transmission.

National Steel's Weir Asks Negotiation With Russia, China

Pittsburgh—E. T. Weir, chairman of National Steel Corp., favors direct negotiations between the United States and Russia and Red China in the interest of world peace. He said: "1. We are not prepared for war. What we need most is time to build up our military strength—not to prepare for war but to prevent war.

"2. Our European friends feel that our present tactics will lead to war with Communist China, which is one reason why we have been receiving only lukewarm support from them in Korea. War with China would also permit Russia to foment trouble in other parts of the world—trouble that we would be too busy to do anything about.

"3. While the decision of peace or war rests largely with us, we cannot make this decision without considering the views of the major European powers. These powers do not see eye-to-eye with us on our approach to settlement of the Asiatic problem.

"4. A demonstration of our willingness to negotiate on Korea and Formosa and the question of recognizing Red China will show the world once again our desire for peace. If negotiation fails, we still will have gained valuable time to strengthen our defenses."

Norton Opens Abrasive Plant

Worcester, Mass.—Norton Co. here has opened a new electric furnace plant to make silicon carbide abrasive at Cap-de-la-Madelaine, Quebec. The plant will make possible a 50 pct boost in the manufacture of Crystolon abrasive, Norton's trade name for silicon carbide.

Operates Smelter in New Plant

Anniston, Ala.—Lee Brothers Foundry, one of the largest brass foundries in the country, is operating a smelter in its new plant here. The furnace has a capacity of 10 tons.

Graphite Process Announced; May Spread Use of Home Product

Alabama flake graphite purified 98 pct . . . Vital to steelmaking.

Birmingham—A chemical process that will purify and concentrate flake graphite to 98 pct carbon has been announced by the University of Alabama and the U. S. Bureau of Mines.

Vital to Steels

The process, vital to defense, is expected to result in reactivation of three mills in Alabama used during World War II and possible building of others. The process was perfected by W. H. Weller, Jr., Birmingham coal and coke dealer.

Flake graphite is a vital ingredient in melting crucible steel and special alloys, and as a coating for black and smokeless powder. It is recognized as one of the ten top critical defense minerals.

Too Much Planning for A-bomb Can Hurt, Too Little Can be Fatal

New York—Too much planning against A-bomb attack can hurt by detracting from the defense effort and too little planning can be fatal, cautioned the Research Institute of America in a report, "Your Business and the A-Bomb."

Management can write to heads of their states for confidential information as to whether they are in probable target areas. Also available to industry is a handbook, "The Effects of Atomic Weapons," which is selling for $1.25 through the Superintendent of Documents, U. S. Government Printing Office, Wash. 25, D. C.

PA's Sponsor Chicago Show

Chicago—More than 100 leading manufacturers and industrial distributors will display their 1951 lines at the 17th Annual Products Show, sponsored by the Purchasing Agents Assn. of Chicago, at the Hotel Sherman on Feb. 20, 21, and 22. Total attendance is expected to exceed 15,000.

STEEL

CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

600 **Tons,** Chicago, 23rd Street Viaduct, to American Bridge Co.

500 **Tons,** Repauno, N. J., building extensions for E. I. duPont de Nemours & Co., Inc., to Bethlehem Fabricating Co., Bethlehem.

400 **Tons,** Harvey, Ill., Y. M. C. A. Bldg., to Joseph T. Ryerson & Son, Inc.

275 **Tons,** Chicago, Racine Ave. pumping station for Sanitary District, to American Bridge Co.

135 **Tons,** Wabasha County, Minn., Bridge No. 6532, to American Bridge Co.

121 **Tons,** Cummington and Goshen, Mass., bituminous concrete and construction and widening of bridges over Crosby Brook, Swift River and Stony Brook. Thomas R. Rawson, North Woburn, Mass., low bidder.

115 **Tons,** Norman County, Minn., Bridge No. 6734 to Illinois Steel Bridge Co.

115 **Tons,** Brown County, Minn., Bridge No. 6756 to American Bridge Co.

100 **Tons,** Bethlehem, Pa., office building for United Steel Workers of America, to Bethlehem Steel Co., Bethlehem.

Fabricated steel inquiries this week included the following:

580 **Tons,** Redwing County, Minn., Bridge No. 6483.

420 **Tons,** Cook County, Ill., Bridge section 42SF for State of Illinois.

410 **Tons,** Redwing County, Minn., Bridge No. 6484.

300 **Tons,** St. Clair County, Ill., Bridge section 146F for State of Illinois.

250 **Tons,** Morrisville, Pa., new bids for administration building and toll collecting facilities, Delaware River Joint Toll Bridge Commission, bids due Jan. 30.

155 **Tons,** Darien, Conn., 70 foot square span composite steel girder bridge and 523 feet of widening and drainage. Bridge overpasses Route 1 and widening and damage is on Post Road. This project involves use of alpha composite construction of a patented design of spiral steel bars. E. T. Nettleton, New Haven, district engineer.

Reinforcing bar awards this week included the following:

390 **Tons,** Chicago, Housing Project Site No. 8, to Bethlehem Steel Corp.

130 **Tons,** DuPage County, Ill., building No. 208 for Argonne National Laboratory, to U. S. Steel Supply Corp.

115 **Tons,** Harvey, Ill., Y. M. C. A. Bldg., to Joseph T. Ryerson & Sons, Inc.

110 **Tons,** Oak Park, Ill., Oak Park Hospital addition, to Ceco Steel Products Co.

Reinforcing bar inquiries this week included the following:

157 **Tons,** Freeport, Maine, project on Route 1 extending around Freeport Village, concrete and bituminous concrete.

Plans Small Motors Plant

Union City, Ind.—To help satisfy increased demand for fractional horsepower motors, Westinghouse Electric Corp. will build a new small motors plant here, with production scheduled to start in late 1951. At full operation the plant will employ about 500.

Construction Behind Demand

Washington—New construction and repair of inland waterway vessels during 1950 kept pace with availability of steel and other materials but lagged behind demand, Chester C. Thompson, president of the American Waterways Operators, Inc., reported recently.

A survery of inland ship construction during 1950 showed that in 7 pct of the nation's shipyards 25 towboats and 505 barges were built during the year. Towboats modernized or repaired came to 1150 while 876 barges were repaired. All yards queried on 1950 production and orders for 1951 delivery report sufficient backlogs to operate at capacity. Orders on hand at one yard will necessitate launching one towboat every 30 days during 1951.

Alabama Makes Industrial Survey

Montgomery, Ala. — Alabama has made an industrial preparedness survey of Alabama's metalworking plants. A 98-page summary has been mailed to government procurement agencies and 100 firms which had the biggest defense contracts during World War II. Bill Dobbins, head of the State Planning Board, said that Alabama was the first state to complete this type of survey.

It shows what the state can contribute to the war effort and shows just where certain products are available. New York and Connecticut are now working on similar surveys.

To Increase Ore Fleet Capacity

Chicago—Inland Steel Co. will increase the capacity of its ore-carrying fleet about 50,000 tons by lengthening the hull of one of its older vessels, the Philip D. Block, while it is laid up this winter. The ore carrier will be opened amidships for the addition of a 72 ft new midsection. Its length will be increased from 600 to 672 ft, about 6 ft less than Inland's giant carrier the Wilfred Sykes. The work will be done by the American Shipbuilding Co. in its South Chicago yards.

publications

Continued from Page 36

blanking, and perforating. Machinability, as measured by a range of low and high speeds of turning in surface feet per minute, is also given. The slide gives specifications for forging, annealing, hardening, and drawing Carpenter stainless steels, as well as information on corrosion resistance, Brinell and Rockwell hardness ranges after drawing, tensile strength, elongation, scaling temperatures safe for continuous service, and whether subject to intergranular corrosion. *Carpenter Steel Co.*

For free copy insert No. 9 on postcard, p. 37.

Corrugated Sheeting

How to use lightweight corrugated steel sheeting to effectively control movement of soil or water is described in a new, illustrated 10-p. booklet pointing out where Armco interlocking and flange type sheeting can be used to advantage. Photographic case-histories show that corrugated sheeting has ample strength, is fast driving and results in lower costs, and can be pulled and re-used many times. Also included in the booklet are data on driving and properties of both types of Armco sheeting as well as a method of figuring sizes and spacing of wales and struts. Contractors and engineers will find the booklet a handy reference. *Armco Drainage & Metal Products, Inc.*

For free copy insert No. 10 on postcard, p. 37.

Pre-Shaped Bar Stock

A new 4-p. bulletin describes a new steel bar stock, cold drawn in special sections to fit specific purposes. The bulletin points out that the pre-shaped feature eliminates many machining operations in the production of steel parts for machines and other products. In some cases, machining may be reduced to a simple cut off operation. Drawings of some typical pre-shaped steel sections are shown and an indication is given of the various analyses in which this specialty stock is available. *A. Milne & Co.*

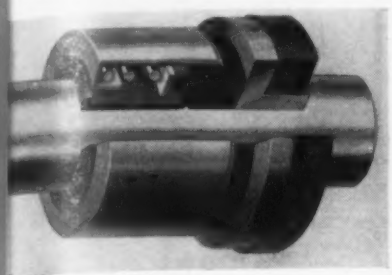
For free copy insert No. 11 on postcard, p. 37.

Resume Your Reading on Page 37

production ideas

Continued from Page 39

fected by leakless and positive contact between carefully lapped metal-to-carbon or metal-to-metal mating surfaces. One of these elements rotates with the shaft and the other



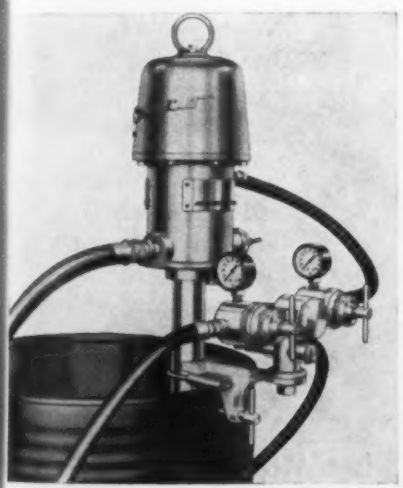
is stationary. The stationary element does not contact the shaft. Seals are made in several standard designs and in a wide range of highest grade materials. Design and material depend upon the service in which the seal is to be used. *Garlock Packing Co.*

For more data insert No. 32 on postcard, p. 37.

Material Handling Pump

Spray gun spurting eliminated by the new Mogul-Type Powerflo pump.

Mogul air-operated, high volume pumps, operating in 400 and 100-lb drums or in bucket-type containers, supply industrial material through



hoses for spray gun pole gun or extrusion gun application. No messy, time-wasting transfer operations are necessary. A device called the Evenflo prevents spurting. Rust and corrosion preventives, caulking compounds, adhesives, undercoaters, other industrial materials, even gummy mastics and non-self-level-

production ideas

Continued

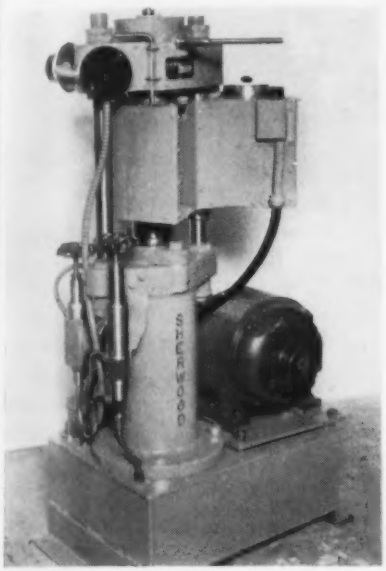
ing substances can be pumped with the new Graco Mogul. Power head of the 35-lb unit is cast aluminum. *Gray Co., Inc.*

For more data insert No. 33 on postcard, p. 37.

Wax Injection Press

For producing wax and plastic patterns for precision casting.

Pattern material is heated by oil circulating only through the revolving drum and crosshead, in the new Sherwood Model WP12 wax injection press. Thermostatically controlled temperatures to 400° F may be attained without overheating the



hydraulic ram mechanism. A separate heating unit for the crosshead and discharge nozzle facilitate free flow of pattern material. Ram pressures, varying with the power of the motor installed, may be developed to 1500 psi. The revolving drum holds four cylinders, each 3½ in. diam x 7 in. long, with 67 cu in. capacity. One section of the drum is cut out, providing ready access for servicing the hydraulic ram and crosshead. *Alexander Saunders & Co.*

For more data insert No. 34 on postcard, p. 37.

Automatic Drill

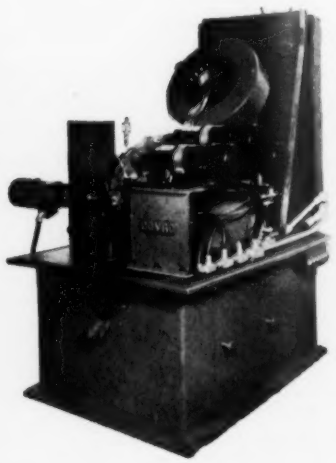
Speeds up drilling, countersinking cotter pin holes in clevis pins.

A new machine performs the operations of drilling cotter pin holes in clevis pins and screws and countersinking both sides at the rate of 1500 pieces per hr. The

production ideas

Continued

machine is fully automatic, employing 4 model-KH Govro-Nelson automatic drilling units which operate simultaneously in conjunction with and completely interlocked with a Geneva type, 8-station indexing dial and a hopper part-feeding mechanism. The machine stops automatically should a tool break or a malformed part jam in the mechanism. It slows down automatically when a tool becomes extremely dull. Indexing mechanism does not work unless tools are out of the work. *Govro-Nelson Co.*



For more data insert No. 35 on postcard, p. 37.

Motor Starter

Features protection of operating personnel and connected machine.

With ratings up to 600 v, 7½ hp polyphase, 5 hp single phase; or 220 v, 1½ hp dc, a new motor starter provides overload protection for single phase, polyphase and dc motors. The self-indicating handle, interlocked cover that prevents opening unless starter is off, and safety latch to lock starter off during servicing are personnel-protection features. Positive motor-protection is provided by the quick-make, quick-break, over-center toggle mechanism—De-ion arc-quenching—and the bimetallic disk-type thermal overload relay. Straight-through wiring facilitates installation and servicing. *Westinghouse Electric Co.*

For more data insert No. 36 on postcard, p. 37.

Resume Your Reading on Page 40

IRON AGE *markets and prices*

market briefs and bulletins

continuing conversion—Detroit auto producers are going ahead with conversion and apparently are having reasonable success with mill arrangements despite increasing tightness in the scrap and pig iron markets. For the first time in the past year or so, a tight ingot market was reported in Detroit. Washington action is having repercussions in Detroit. Unless use restrictions are balanced with quota cuts, artificial production dislocations are certain. For example, nickel is very scarce because it has been cut drastically while applications haven't been cut back nearly as much.

tinplate extras—U. S. Steel Co.'s tinplate prices, previously announced, were effective Jan 16. Extras apply on widths of 26 in. and under, with deductions for widths over 28 in. Length extras vary with base weight and length. Quantity extras apply under 7500 lbs. Resquaring extras are 40c for ends or sides, 60c for ends and sides. Hollowware enameling extras are 10c for 30 gage, 30c for 31 gage. Width extras and deductions apply as above. Length extras are 5c over 40 in. to 48 in.; 25c over 48 in. to 124 in.

steel capacity — Increased steelmaking capacity has made necessary a revision in operating rate. Revised rate for the week of Jan. 1, is 98.2, down 3.6 points from 101.8. Revised rate for the week of Jan. 8, is 99.1, down 3.6 points from 102.7. The revised figure is based on a rate of 104,229,650 tons.

shudder at the thought — Metallurgists shudder when they think what an all-out jet engine program could do to alloy steel distribution. In the postwar era, most firms shifted back to chrome, molybdenum, and nickel alloys. Now they are confronted with the necessity of shifting away again. The change may be coming fast.

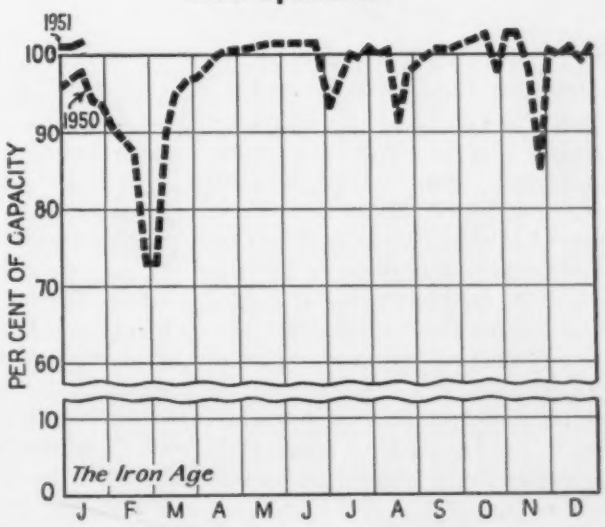
cobalt bearing, electrical alloys—Allegheny Ludlum Steel Corp. has announced a 7½ pct increase in the price of cobalt-bearing high temperature and electrical alloys. The new prices were effective Jan. 12. Higher costs of alloys contributed to the price rise.

tool steel prices—Due to increases in the cost of tungsten since Jan. 1, increases of 2c to 13½c per lb in prices of high speed and tool steels have been announced by Allegheny Ludlum Steel Corp., Crucible Steel Co., Firth Sterling Steel & Carbide Corp., and Jessop Steel Co. Crucible's changes were effective Jan 13, the others Jan. 12.

Lone Star loan approved—Approval of a $73,425,201 loan to Lone Star Steel Co., Dallas, Tex., for construction of a tubular steel products mill to serve the oil industry has been announced by government agencies. The plant, to be built near Dainger Field, will be ready in about 18 months. RFC will loan $50 million of the sum, and the balance will be loaned under the Defense Production Act. Lone Star must provide $9 million outside the loan.

Wheeling adds coke capacity — Wheeling Steel Corp. will add 63 new coke ovens to its East Steubenville works at a cost of $8¾ million. The new battery, to be built by Koppers Co., will raise Wheeling's annual capacity to 145,000 tons.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Jan. 7	96.0	101.0	93.5*	98.0	104.0	104.0	99.0*	107.0*	97.0	106.0	90.0	90.5	98.0	99.0*
Jan. 14	96.0	101.0	94.0	95.0	103.8	104.0	97.5	106.0	100.0	106.0	90.5	95.1	117.2	99.5

* Revised.
** Beginning Jan. 1, 1951, operations are based on an annual capacity of 104,229,650 net tons.

nonferrous metals

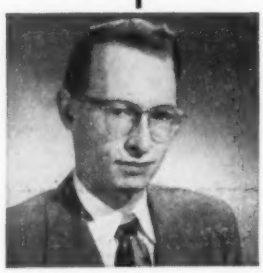
outlook and market activities

NONFERROUS METALS PRICES

	Jan. 10	Jan. 11	Jan. 12	Jan. 13	Jan. 15	Jan. 16
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake, delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.71	$1.73	$1.75	....	$1.72	$1.74*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.



by R. Hatschek

New York — National Production Authority has issued an order closely controlling the movement of aluminum scrap. The order (M-22) is similar to the control order placed on copper scrap and provides that only certain approved smelters and fabricators may melt aluminum scrap. One exception is that foundries may, under certain conditions, remelt risers, sprues, gates and defective castings of their own manufacture.

Aluminum Conversion Banned

NPA reserves the right to specify just which alloys may be made from scrap and requires all persons other than those approved in the order to deliver any scrap which they produce or own within 60 days or as soon as a carload is accumulated to the approved smelters, fabricators, or to dealers. Dealers are required to segregate scrap aluminum according to alloy and toll or conversion agreements are banned unless approved by NPA.

At press time there were no changes in the prices of aluminum scrap or secondary ingots and it was still too early to tell what the general effects would be on the scrap and secondary metal industries.

Meanwhile, price control discussions are continuing in Washington with the Economic Stabilization Agency using the old OPA price schedules as a guide. A brief summary of ESA thinking follows: Primary lead and zinc prices are stable enough and "immediate" controls are not planned; scrap, however, may be put under ceilings in the near future. Nickel scrap prices are in preliminary discussion stage and no immediate action is contemplated.

Continuation of the ESA-industry talks on price controls for aluminum, brass and copper scrap is slated for this week and next week. ESA is not expecting any aluminum price changes at present.

President Truman, in his Jan. 12 message to Congress, called for suspension of the copper import tariff and bills have been introduced in both houses for that purpose. In the House, Representatives Mills, D., Ark., and Patterson, R., Conn., are trying to arrange for early hearings on the subject. Representative Patterson says he expects "complete bipartisan cooperation" in enacting the suspension legislation.

Tin Market Surges, Dips

The tin market has started on another inflationary upswing with new alltime high prices being scored each day. Last week the price was boosted several cents each day until on Friday it reached $1.75 per lb for prompt delivery. Early this week the price dipped on news of a possible international allocation program, then rose again.

The December report of statistics by the Copper Institute showed crude production, including both primary and secondary metal, at a total of 1,057,113 net tons for 1950, the highest total since 1944. Deliveries to fabricators during December added up to 121,954 tons and brought the year's total to 1,373,194, nearly as high as the postwar peak set in 1947.

Copper Production at Peak

Total domestic production in 1950 of refined copper totaled 1,270,768 net tons, topping all previous production records. Refined copper stocks, on the other hand, decreased another 2765 tons in December, leaving the stocks at a low of only 49,040 tons on hand.

The Handy and Harman summary of the silver market in 1950 indicates an increase in Western Hemisphere production of the metal amounting to about 6 pct to a total of 134,700,000 Troy ounces. Consumption by industry and the arts established a new postwar record, as did U. S. imports.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 43.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 55¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb. base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask	
f.o.b. New York	$187.50 to $198.00
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.74
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	30.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	31.00-31.50
No. 12 alum. (No. 2 grade)	30.50-31.00
108 alloy	30.75-31.25
195 alloy	32.25-32.75
13 alloy	33.50-34.00
ASX-679	30.75-31.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.00-32.50
Grade 2—92-95%	30.25-31.00
Grade 3—90-92%	29.50-30.00
Grade 4—85-90%	29.00-29.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33¾
Rolled, oval, straight, delivered	38⅝
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34⅝
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	53.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	20½	18⅝
Red brass	21½	20⅝
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅝	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	18.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
No. 1 composition	20.00
No. 1 comp. turnings	19.75
Rolled brass	16.50
Brass pipe	18.50
Radiators	15.25
Heavy yellow brass	15.00
Aluminum	
Mixed old cast	18½
Mixed new clips	20½
Mixed turnings, dry	18½
Pots and pans	18½—18¾
Low copper	21½—21¾

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18 —18½
Light copper	17 —17½
New type shell cuttings	17 —17¼
Auto radiators (unsweated)	14½—15
No. 1 composition	17 —17½
No. 1 composition turnings	16½—17
Clean red car boxes	15½—16
Cocks and faucets	15½—16
Mixed heavy yellow brass	13 —13½
Old rolled brass	14 —14½
Brass pipe	17 —17½
New soft brass clippings	17½—18
Brass rod ends	16½—17
No. 1 brass rod turnings	16 —16½
Aluminum	
Alum. pistons and struts	12 —13
Aluminum crankcases	15 —16
2S aluminum clippings	18½—19½
Old sheet and utensils	15 —16
Borings and turnings	12½—13
Misc. cast aluminum	15 —16
Dural clips (24S)	15 —16
Zinc	
New zinc clippings	14½—15
Old zinc	11 —11¼
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	57 —60
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel Clippings	22 —25
Clean Monel turnings	18 —20
Old sheet Monel	20 —22
Inconel clippings	26 —28
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	15 —15¼
Battery plates (dry)	8¾— 9
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	85 —90
No. 1 pewter	63 —65
No. 1 auto babbitt	58 —60
Mixed common babbitt	12¼—12½
Solder joints	18½—19
Siphon tops	58 —60
Small foundry type	16¼—16½
Monotype	14¾—15
Lino. and stereotype	14½—14¾
Electrotype	12¾—13
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8 — 8¼
Electro. dross	6½— 6¾

SCRAP *iron and steel*

markets prices trends

Prices surging upward as scrap field goes down last lap to controls . . . Voluntary control rumor heard . . . Price picture cloudy.

Markets in several important areas were boiling over with prices surging upward this week as scrap men went down the last lap to Economic Stabilization Agency controls—voluntary or mandatory.

Prices of steelmaking grades shot up $5.75 to $6.75 a ton in Buffalo when the principal local buyer came into the market to offset raiding by big out-of-district mills. Steelmaking grades in Philadelphia were up $5 a ton.

Some sources believe that the increases were caused by consumers who wanted to get orders placed ahead of any price controls that might be placed in effect.

In Pittsburgh it was rumored that controls would be on a voluntary basis with the big stick of threatened enforcement if they faltered. It is conceded that voluntary controls won't be too effective. They will merely be an extension of the formula, perhaps on a slightly lower price basis. Voluntary controls will not stop behind-the-contract deals and upgrading, some maintain.

ESA has indicated that it will control specific basic commodities first. Presumably it is simpler to control prices of items that wind up in the hands of relatively few producers than to regulate prices of products that reach millions.

PITTSBURGH — The trade is looking for an announcement within the next 10 days on price controls. Indications are that controls will be applied on a voluntary basis with the threat of enforced control if the voluntary system breaks down. It is generally agreed a voluntary system will not work. Meanwhile, demand continues strong with some mills experiencing difficulty obtaining material at present levels. Controlled prices are expected to be generally $1.50 lower than existing prices. Cast grades and railroad specialties are likely to be cut back more drastically.

CHICAGO — Activity in the scrap market was at a minimum this week as the trade awaited definite word on price controls. Brokers and dealers are lowering their offerings in expectation of lower controlled prices. Dealers are trying to cut down inventory. Few sales are being made to consumers. Cast grades and railroad items are expected to come down considerably when controls are put on.

PHILADELPHIA — Last-minute developments in the scrap trade here and in other centers have precipitated a wild market with prices for steelmaking grades substantially higher. No. 1 heavy melting and No. 1 bundles are $5 per ton higher. No. 2 is up $2, and No. 2 bundles are up $1. Low phos grades are up in sympathy. Earlier increases were scored by railroad specialties, chemical borings and malleable cast scrap. The reasons behind this renewed activity are (1) mills are in poor inventory situations, and (2) consumers expect shipments to drop off severely in the adjustment period when prices are fixed.

NEW YORK — The Scrap Institute convention held the spotlight in this section. Prices were stable and scrap shipments good. Washington developments and the possible pricing method were still a good topic for conversation. Scrap men think they are on the last lap to price controls with cast grades due for a rollback.

DETROIT—There is no change in the Detroit scrap market this week. Dealers and brokers are waiting for price controls and some orders have been accepted, "subject to subsequent government regulations. The amount of free scrap being sold is diminishing further. Cast grades are weaker in the face of uncertainty about price controls and the extent to which rearmament will replace industrial production.

CLEVELAND — A strong but subdued scrap market here and in the Valley is marking time this week in anticipation of mandatory price controls. Press time rumors had it that no announcement of new prices will be made this week and that industry and trade representatives may be called back for a final check after the regulations are written. Scrap is moving but the volume of shipments leaves much to be desired from a consumer's point of view. Foundry grades are strong but showing little activity.

ST. LOUIS — Further declines in the scrap iron list were reported during the week as a result of anticipation of price rollbacks by the ESA. This is especially true of railroad lists. There has been little buying by consumers because of the prospects of rollbacks.

BIRMINGHAM—The scrap steel market here is exceptionally strong. Northern buyers are taking everything they can get and local brokers and dealers are sending what they buy to that area after needs of local buyers are cared for. Republic Steel is paying $40.50 for No. 2 bundles and assuming freight charges from Atlanta, bringing the delivered price at Alabama City to $42.46. The North-South formula differential has been reduced to $3.00. The cast market continues weak and has dropped another dollar to $55.00. A sale of one carload of cast iron borings was reported at $34 a ton.

CINCINNATI—Prices are unchanged in a moderately active market here. Shipments are moving and brokers are trying to get some of their old paper cleaned up before announcement of price regulations. Foundry grades are very quiet and buyers are staying out of the market with lower prices seemingly on the way.

BOSTON—News of price controls from Washington was being awaited on all sides. Activity in the Boston area was generally good, with a few specialities reported selling at over the formula price. Mixed cupola cast moved up a $1 to a new price of $45 to $46.

BUFFALO—To offset raiding by out-of-district mills, the principal local buyer came into the market this week for a very substantial tonnage of steelmaking scrap at prices well above the preceding week. Steelmaking grades are up $5.75 to $6.75 per ton. Low phos increased in sympathy. At the same time it is understood that old orders were cancelled. These prices do not apply to allocated or earmarked material.

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	42.75 to 43.50
Machine shop turn.	37.75 to 38.50
Mixed bor. and ms. turns.	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	56.00 to 56.50
Heavy turnings	46.50 to 47.00
No. 1 RR. hvy. melting	45.75 to 46.50
Scrap rails, random lgth.	64.50 to 65.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	63.00 to 64.00
RR. spring steel	63.00 to 64.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	67.50 to 68.00
Mixed yard cast.	57.50 to 58.00
Heavy breakable cast	52.50 to 53.00
Malleable	71.00 to 72.00

Chicago

No. 1 hvy. melting	$44.25 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. forge crops	54.00 to 55.00
Low phos. plate	52.00 to 53.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	62.00 to 63.00
Rerolling rails	65.50 to 66.50
Rails 2 ft and under	67.00 to 69.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	95.00 to 100.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	62.00 to 64.00
No. 1 agricul. cast.	58.00 to 60.00
Heavy breakable cast.	53.00 to 55.00
RR. grate bars	48.00 to 49.00
Cast iron brake shoes	52.00 to 53.00
Cast iron car wheels	58.00 to 59.00
Malleable	78.00 to 82.00

Philadelphia

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	38.00 to 39.00
Low phos. punchings, plate	51.00 to 52.00
Low phos. 5 ft and under	51.00 to 52.00
Low phos. bundles	50.00 to 51.00
Hvy. axle forge turn.	44.00 to 45.00
Clean cast chem. borings	44.00 to 45.00
RR. steel wheels	56.00 to 57.00
RR. spring steel	56.00 to 57.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	62.00 to 63.00
Mixed yard cast.	53.00 to 55.00
Heavy breakable cast.	53.00 to 54.00
Cast iron carwheels	67.00 to 68.00
Malleable	70.00 to 72.00

Cleveland

No. 1 hvy. melting	$45.25 to $46.00
No. 2 hvy. melting	43.25 to 44.00
No. 1 busheling	45.25 to 46.00
No. 1 bundles	45.25 to 46.00
No. 2 bundles	42.25 to 43.00
Machine shop turn.	37.25 to 38.00
Mixed bor. and turn.	39.25 to 40.00
Shoveling turnings	39.25 to 40.00
Cast iron borings	39.25 to 40.00
Low phos. 2 ft and under	47.75 to 48.50
Steel axle turn.	44.25 to 45.00
Drop forge flashings	45.25 to 46.00
No. 1 RR. hvy. melting	46.00 to 46.50
Rails 3 ft and under	70.00 to 71.00
Rails 18 in. and under	72.00 to 73.00
No. 1 machinery cast.	69.00 to 70.00
RR. cast.	71.00 to 72.00
RR. grate bars	50.00 to 51.00
Stove plate	55.00 to 56.00
Malleable	76.00 to 77.00

Youngstown

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	$42.75 to $43.00
Machine shop turn	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	48.25 to 49.00

Buffalo

No. 1 hvy. melting	$51.25 to $52.00
No. 2 hvy. melting	49.25 to 50.00
No. 1 bushelings	49.25 to 50.00
No. 1 bundles	50.25 to 51.00
No. 2 bundles	47.25 to 48.00
Machine shop turn.	43.25 to 44.00
Mixed bor. and turn.	43.25 to 44.00
Shoveling turnings	45.25 to 46.00
Cast iron borings	43.25 to 44.00
Low phos. plate	51.25 to 52.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast.	59.00 to 60.00
No. 1 cupola cast.	54.00 to 55.00
Small indus. malleable	60.00 to 61.00

Birmingham

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	40.50 to 41.50
No. 2 bundles	39.50 to 40.50
No. 1 busheling	40.50 to 41.50
Machine shop turn.	34.00 to 35.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	33.00 to 34.00
Bar crops and plate	47.00 to 48.00
Structural and plate	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
Angles & splice bars	59.00 to 60.00
Std. steel axles	61.00 to 62.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	49.00 to 50.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$43.75 to $44.50
No. 2 hvy. melting	41.75 to 42.50
No. 2 bundled sheets	40.75 to 41.50
Machine shop turn.	33.75 to 34.75
Shoveling turnings	36.50 to 37.50
Rails, random lengths	49.00 to 50.00
Rails 3 ft and under	62.00 to 63.00
Locomotive tires, uncut	50.00 to 51.00
Angles and splice bars	59.00 to 60.00
Std. steel car axles	90.00 to 95.00
RR. spring steel	53.00 to 54.00
No. 1 machinery cast.	55.00 to 56.00
Hvy. breakable cast.	48.00 to 49.00
Cast iron brake shoes	53.00 to 54.00
Stove plate	45.00 to 47.00
Cast iron car wheels	60.00 to 62.00
Malleable	55.00 to 57.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	36.00
Machine shop turn.	31.00
Mixed bor. and turn.	31.00
Shoveling turnings.	33.00
Clean cast chem. bor.	$38.00 to 39.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	47.00 to 48.00
Unstrp. motor blocks	42.00 to 43.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.67
No. 2 hvy. melting	33.67
No. 1 bundles	38.00
No. 2 bundles	$32.67
Machine shop turn.	27.67
Mixed bor. and turn.	$26.67 to 27.67
Shoveling turnings	29.67
No. 1 busheling	35.67
Clean cast chem. borings	33.00 to 34.00
No. 1 machinery cast.	48.00 to 49.00
Mixed cupola cast.	45.00 to 46.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	42.00 to 43.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$40.25
No. 2 hvy. melting	38.25
No. 1 bundles, openhearth	40.25
No. 1 bundles, electric furnace	42.75
New busheling	40.25
Flashings	40.25
Machine shop turn.	32.25
Mixed bor. and turn.	32.25
Shoveling turnings	34.25
Cast iron borings	34.25
Low phos. plate	43.75
No. 1 cupola cast.	$54.00 to 56.00
Heavy breakable cast.	45.00 to 47.00
Stove plate	44.00 to 46.00
Automotive cast.	58.00 to 60.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$44.25
No. 2 hvy. melting	42.25
No. 1 bundles	44.25
No. 2 bundles, black	42.25
No. 2 bundles, mixed	41.25
Machine shop turn.	33.00
Mixed bor. and turn.	34.00
Shoveling turnings	34.00
Cast iron borings	34.00
Low phos.-steel	46.75
Low phos. 18 in. under	62.00
Rails, random lengths	$62.00 to 63.00
Rails, 18 in. and under	72.00 to 73.00
No. 1 cupola cast.	65.00 to 66.00
Hvy. breakable cast.	59.00 to 60.00
Drop broken cast.	71.00 to 72.00

San Francisco

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Machine shop turn.	16.00
Elec. fur. 1 ft and under	$40.00 to 42.50
No. 1 RR. hvy. melting	30.00
Scrap rails random lgth.	30.00
No. 1 cupola cast.	43.00 to 46.00

Los Angeles

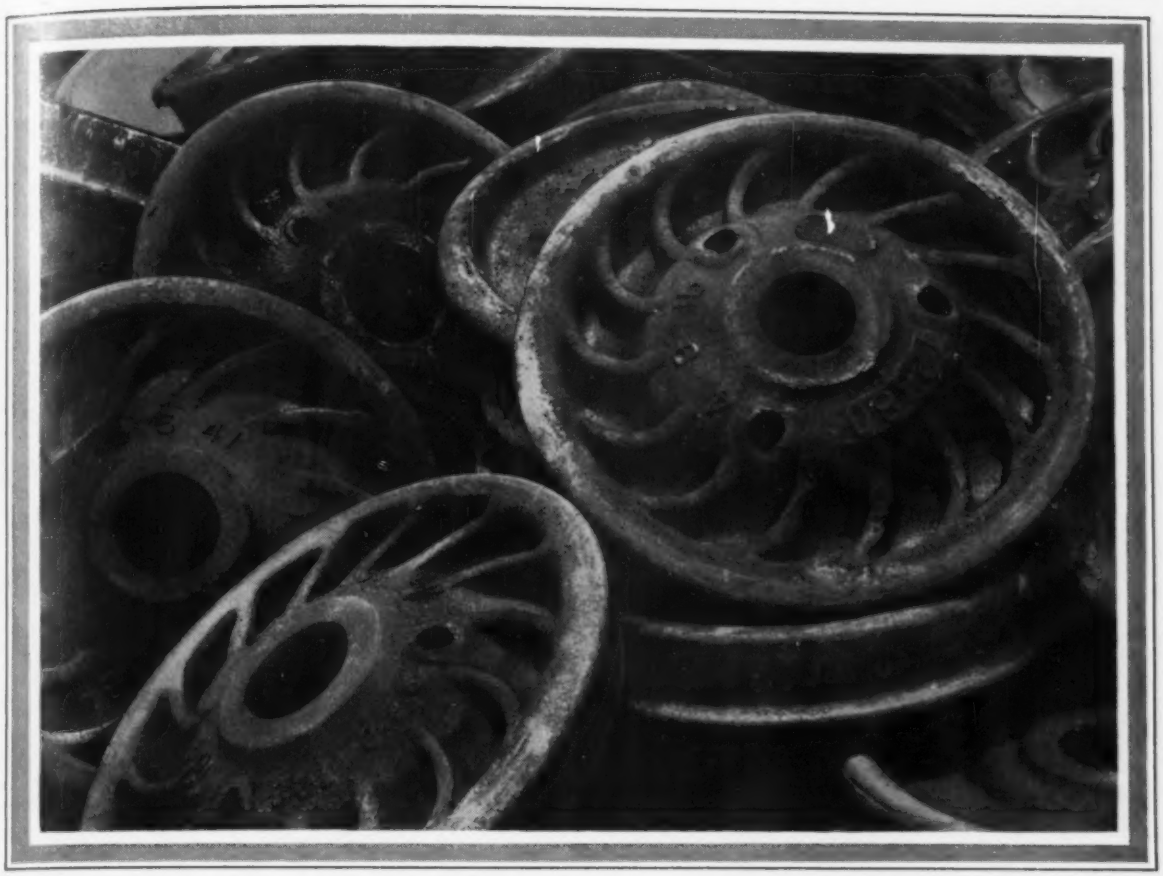
No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Mach. shop turn.	16.00
Elec. fur. 1 ft and under	$42.00 to 45.00
No. 1 RR. hvy. melting	30.00
Scrap rails, random lgth.	30.00
No. 1 cupola cast.	52.00

Seattle

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	28.00
No. 1 bundles	32.00
No. 2 bundles	23.00
No. 3 bundles	18.00
Elec. fur. 1 ft and under	$40.00 to 45.00
RR. hvy. melting	29.00
No. 1 cupola cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed steel scrap	26.00
Mixed bor. and turn.	23.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bush., new fact. prep'd.	29.00
Bush., new fact, unprep'd.	23.00
Short steel turnings	23.00
Cast scrap	45.00



cast iron railroad car wheels

use:

Cast iron wheels are used by grey iron foundries in the making of new castings. They are particularly good scrap for the cupola because these wheels are heavy and are of uniform analysis forming a stable part of the cupola mixture. Though car wheels are broken up before being charged in the Cupola, they are accepted in the Open Hearth furnace without being broken. The veining on the inside rail of the wheel usually identifies cast iron from steel car wheels.

source:

Old Wheels from Railroad Cars.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Cast iron car and/or locomotive wheels

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2110 Railway Exchange Bldg.

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-rolled Steel: (cents per pound)	Jan. 16, 1951	Jan. 9, 1951	Dec. 19, 1950	Jan. 17 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	3.995
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302).	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Jan. 16, 1951	Jan. 9, 1951	Dec. 19, 1950	Jan. 1 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	47.08
No. 2, Birmingham	48.88	48.88	48.88	40.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	181.20	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$46.13	$46.13	$46.13	$29.75
Heavy melt'g steel, Phila.	49.50	44.50	44.50	23.00
Heavy melt'g steel, Ch'go	44.63	44.63	44.75	26.50
No. 1 hy. com. sh't, Det.	40.25	40.25	44.13	23.50
Low phos. Young'n	48.63	48.63	48.63	30.75
No. 1 cast, Pittsburgh	67.75	67.75	67.75	37.50
No. 1 cast, Philadelphia	62.50	62.50	62.50	37.00
No. 1 cast, Chicago	63.00	63.00	65.00	38.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.74†	$1.63*	1.55	76.25
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	28.75

†Tentative. *Revised.

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)]

	Finished Steel Base Price	Pig Iron	Scrap Steel
Jan. 16, 1951	4.131¢ per lb.	$52.69 per gross ton	$46.75 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	45.09 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	45.13 per gross ton
One year ago	3.837¢ per lb.	46.05 per gross ton	26.42 per gross ton

	High	Low	High	Low	High	Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Dec. 12	$46.75 Jan. 16	$45.09 Jan. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jar. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 3
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17]	$70.00[1,4]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[16]	4.10[2,4,33]	4.10[6]	4.10[3]			4.10[6]				4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[38]	3.60[8,35]	3.60[1,6,8]	3.60[4]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]		3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15] 5.35[53]		4.35[1,6,8]	4.35[4]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]		4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,6]		4.80[4]	4.80[7]	6.00[24]					4.80[3]		
Enameling (12 gage)	4.65[1]		4.65[1,6]			4.65[7]								
Long ternes (10 gage)	5.20[9,15]						6.00[24]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,6] 5.90[6]	5.40[4]			5.40[1,4,13]		5.40[3]	5.85[26]		5.40[3]		
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,6] 7.05[6]	6.55[4]			6.55[4]		6.55[3]			6.55[3]		
Hi str. low alloy, galv.	7.20[1]													
STRIP Hot-rolled	3.60[9], 4.00[41,55] 3.75[38] 3.50[4]	3.50[45]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]		3.50[3]		4.40[47]
Cold-rolled	4.65[5,9] 5.00[38] 5.35[53,55]	4.90[8,45]	4.90[6]	4.65[3]		4.65[7]	4.65[4,6] 5.35[13,40]		4.65[3]			4.65[3]		5.45[47] 5.80[48] 5.60[31]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6] 5.80[4]				4.95[4], 5.50[1] 5.40[13]			5.55[26]				
Hi str. low alloy, c.r.	7.20[9]			6.70[4]			6.20[4], 6.55[13]							
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 25¢	$8.70[1,9,15]		$8.70[1,6]				$8.70[4]					8.80[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[14]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing‡	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[3,4,5,52,71]	4.55[3,69,70,72,73]	4.55[7,4,73]	4.55[3]	4.55[4,53]									4.70[54]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[31]
Alloy, cold-drawn	5.40[17,52,69,71]	5.40[4,33,69,70,73]	5.40[4] 5.90[7,4]		5.40[4,53]			5.40[3]	5.40[3]					5.55[54]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,6] 6.05[6]	5.55[4]			5.55[1]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15]	3.70[1]	3.70[1,6,8]	3.70[4] 4.00[9]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]		
Floor plates			4.75[3]	4.75[3]						4.75[26]				
Alloy	4.75[1] 4.85	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,6]	5.65[4,6]			5.65[4] 5.70[13]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,6]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,6]					5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[3,5] 5.10[16]	4.85[3] 4.95		4.85[3]				Kokomo—5.80[48]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[3]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LA, S=$85.00[82]		Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[82]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[3] LA=4.90[84,83]	Worcester=4.40[3] Minnequa=4.35[14]	WIRE RODS
		3.80[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[54], Geneva=3.70[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4, 11]	SF, LA=5.55[24]	Ashland=4.80[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		HI str. low alloy, h.r.
			F=7.50[19]		HI str. low alloy, c.r.
					HI str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4]	SF, LA=4.25[24,83] F=4.75[19], S=4.50[83]	Atlanta=4.05[85] Minnequa=4.55[14]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[37]	New Haven=5.15[3], 5.85[88]	Cold-rolled
		5.30[11]	F=6.20[19]		HI str. low alloy, h.r.
					HI str. low a'loy, c.r.
					TINPLATE Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4, 11]	SF, LA=4.40[24]	Atlanta=4.25[85] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4, 11]	SF, S=4.45[83] F=4.40[19] LA=4.40[83]	Atlanta=4.25[85] Minnequa=4.50[14]	Reinforcing‡
				Newark=5.00[89] Putnam=5.10[89] Hartford=5.10[4] Los Angeles=6.00[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[82] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[89] Worcester=[3] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19]		HI str. low alloy, h.r.
	4.10[83]	3.70[4, 11]	F=4.30[19] S=4.80[82] Geneva=3.70[16]	Claymont=4.15[39] Coatesville=4.15[31] Minnequa=4.50[14]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19] Geneva=5.65[16]	Coatesville=5.25[31] Claymont=4.85[39]	Alloy
		5.65[11]	F=6.25[19]		HI str. low alloy
4.25[83]	4.05[83]	3.85[4, 11]	SF=4.20[83] F=4.25[16] LA=4.25[24,83] S=4.30[83]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.60[11]	F=6.10[19]		HI str. low-alloy
5.40[83]	5.25[83]	4.85[4, 11]	SF, LA=5.80[24]	Atlanta=5.10[85] Worcester=5.15[3] Minnequa=5.10[14]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chemical Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 30; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa. 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	113	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85	....	....	....	....	....	....	....	....
Cleveland-86	....	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	....	140	5.70	6.15
Duluth-2	118	130	....	123	....	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	136	5.70	6.15
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	138	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	130	142	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	....	....
Pittsburg, Cal.-24	137	149	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53) Wheeling, W. Va., (15).

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $105.30 to $108.80
6 to 24-in., del'd N. Y. 104.50 to 105.50
6 to 24-in., Birmingham 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less $108.50 to $113.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.60	4.00	4.70	....	....	....	....	....
Chicago-4	....	....	....	6.15	....	....	....	....
Ensley-11	3.60	4.00	....	....	....	....	....	....
Fairfield-11	....	4.00	4.40	....	....	8.60	4.50	....
Gary-1	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor-8	3.60	....	4.70	6.15	5.25	8.60	4.50	....
Johnstown-3	....	4.00	....	....	5.60	8.60	....	....
Joliet-1	....	4.00	4.70	....	....	....	....	....
Kansas City-83	....	....	....	6.40	....	....	....	....
Lackawanna-3	3.60	4.00	4.70	....	....	8.60	4.50	....
Lebanon-3	....	....	....	6.15	....	....	....	9.85
Minnequa-14	3.60	4.50	4.70	6.15	....	8.60	4.50	9.85
Pittsburgh-77	....	....	....	....	....	9.35	....	9.85
Pittsburgh-78	....	....	....	....	....	....	....	9.85
Pittsburgh-5	....	....	....	6.15	....	....	....	....
Pittsburg-24	....	....	....	....	....	....	4.65	....
Seattle-62	....	....	....	6.10	....	....	4.35	....
Steelton-3	3.60	....	4.70	....	....	....	4.50	....
Struthers-6	....	....	....	6.15	....	....	....	....
Torrance-24	....	....	....	....	....	....	4.65	....
Youngstown-4	....	....	....	6.15	....	....	....	....

Track Bolts, heat treated, to railroads, 9.85¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, c.l. lots, cut lengths 10 to 24 ft.

OD in in.	gage BWG	Seamless H.R.	Seamless C.D.	Electric Weld H.R.	Electric Weld C.D.
2	13	$22.67	$26.66	$21.99	$25.86
2½	12	30.48	35.84	29.57	34.78
3	12	33.90	39.90	32.89	38.70
3½	11	42.37	49.89	41.10	48.38
4	10	52.60	61.88	51.03	60.03

Pittsburgh Steel add, H-R: 2 in., 63¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more $41.00
60% or less 38.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ in. Blk.	BUTTWELD ½ in. Gal.	¾ in. Blk.	¾ in. Gal.	1 in. Blk.	1 in. Gal.	1¼ in. Blk.	1¼ in. Gal.	1½ in. Blk.	1½ in. Gal.	2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	SEAMLESS 2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	3½-4 in. Blk.	3½-4 in. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	21.0	31.5	22.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.0
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.0
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Toledo-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.0
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	18.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.0	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Toledo-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery, add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.80	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.90	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[5]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.55	8.00	6.10	.....	6.05	5.90	6.05	6.61	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70	8.70	.....	8.05	8.30	8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.80	9.45[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb.; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-83	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	53.25	53.75	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, O.-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, O.-97,98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-28	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works)*

Carloads, Per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 18.70

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed $61.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $17.50
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	21.00
Detroit, f.o.b.	23.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Plainesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	21.00
St. Louis, f.o.b.	24.90
Birmingham, del'd	20.79

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)

	Per gross ton
Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	5.35¢
0.41 to 0.60 carbon	6.30¢
0.61 to 0.80 carbon	7.40¢
0.81 to 1.05 carbon	9.35¢
1.06 to 1.35 carbon	11.65¢

Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢. New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
⅝ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
⅝ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct. Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.86
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.38
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.5¢
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	20.50¢ to 23.85¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Botton-15		7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28		7.25	8.50	9.30	9.85		
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22		7.95	9.20				
Ind. Harbor-3	6.75	7.25					
Mansfield-75	6.75	7.25	8.50	9.30			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Transformer 52, 80¢ above Transformer 58.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	30.50
0.10% C	30.00	0.50% C	30.25
0.15% C	29.75	1.00% C	30.00
2.00% C			30.75
65-69% Cr, 4-9% C			29.00
62-66% Cr, 4-6% C, 6-9% Si			29.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C	$1.01
0.50% max. C	1.01
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe

Carloads	19.00
Ton lots	22.10
Less ton lots	23.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	10.00
Ton lots	12.10
Less ton lots	13.50

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O. $185
F.o.b. Johnstown, Pa. $187
F.o.b. Sheridan, Pa. $185
F.o.b. Etna, Clairton, Pa. $188
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.45
Ton lots 12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 29.75
Ton lots 31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 33

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn .....19.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd., Mn. 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $89.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe 21.70
97% Si, 1% Fe 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si.....	19.00	75% Si.....	14.30
50% Si.....	12.40	85% Si.....	15.55
90-95% Si			17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 8.15¢
Ton lots ..... 9.55¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo $1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.33
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.05
Crucible 3.10- 3.15
High speed steel (Primos) 3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13
almanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢
Vanadium pentoxide, 85-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.3[illegible]
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... $1.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $5.25
Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound..... 50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢
Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.30
F.o.b. Wash., Pa.; 100 lb, up
10 to 14% B..... .75
14 to 19% B..... 1.20
19% min. B..... 1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
Ton lots $1.46
Less ton lots 1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.30
Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

Set Steel Output Records

Chicago—Record steel production was achieved during 1950 at the Gary and South Chicago works of the U. S. Steel Co. Production of openhearth ingots at the Gary works totaled 5,780,358 tons to top the previous record of 5,713,509 tons set in 1944, while at South Chicago, 3,898,145 tons were produced, bettering the 1942 record of 3,831,633 tons. At the company's Gary sheet and tin mill, total shipments from all departments came to 2,181,873 tons, well above the former record set in 1947.

Study OPA Scrap Ceilings

Washington—Government price stabilizers studied World War II price ceilings on iron and steel scrap this week as they moved toward imposition of new mandatory controls.

A 5-man industry subcommittee on specifications was scheduled to meet with Economic Stabilization Agency officials early this week to discuss pricing recommendations submitted by the industry.

Approximately 50 industry officials met with ESA last week to discuss scrap differentials. The agency said pricing schedules that were applied to the industry by OPA were "used as guideposts."

Steel Doors Imprison Hot Atoms

Upton, N. Y.—Eleven-ton steel doors enclose three stainless steel cells backed by concrete walls 3-ft thick which seal off experiments with hot atoms at the new Hot Lab building here. The building is headquarters for processing "hot" materials, or radioisotopes, emerging from the Brookhaven reactor after neutron bombardment.

The steel doors are 1-ft thick, 3½-ft wide, and 11-ft high. They close in 5 seconds and stop automatically at the desired spot. These hot lab experiments are sealed off in the cells and operated by remote control. Researchers observe results through periscopes.

THE CLEARING HOUSE

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Temporary Slow-Down—Cuts in auto production in Detroit have temporarily slowed down spiraling demand for used and rebuilt machines in the Detroit area. While firms doing a large out-of-town business report no fluctuation in demand, some Detroit buyers are hesitant to buy because they believe that an appreciable production gap will ensue before major defense output starts.

Relinquish Reluctantly — Good used equipment is still as scarce as ever in Detroit. Faced with an indefinite war production role, owners of the good stuff are holding tight to what they have. Even some firms closed since World War II are sitting tight on machines that might fit into another defense role. When Washington finally sheds its befuddlement on its defense needs and starts war output rolling, owners will then shed surplus machines to a revived market.

A Crying Need—Some in Detroit feel that price ceilings on equipment would be a blessing at this time. Machine tool circles here are harping on the ceilings topic but Washington will yield no positive indication that controls are imminent. The need is shown by reports that a vertical mill, for example, which sold for $1385, was later resold for $2450 and then again changed hands at $3050.

Inflation has found green pastures in the used machinery field. Delivery dates on new machinery show no signs of shortening and, with no method of checking high-flying prices, premium prices for equipment may be expected for some time to come, is the consensus of the trade.

Anticipating Need — Detroit demand for tool room equipment has always been vital and this market has tightened up considerably in recent months. One popular theory is that tool and die shops reason that they will eventually need this equipment to build the jigs and fixtures for war work.

Duplicating Demand — Market analysts who have examined hot demand for machine tools here are convinced that much of the market's heat is based on duplication of inquiries by as many as ten firms which may be seeking the same scarce machine. Inquiries, they point out, do not for most items reflect the true condition of the market. What does reflect market demand more accurately is soaring prices, it is obvious.

Press Equipment—Also in the high demand brackets is press equipment. Inquiries for electrical and welding equipment, although continuing in good volume, have eased somewhat, says the trade.

Ringing Doorbells — Sales resistance to doorbell ringing in the hunt for surplus machines is rough. If the owner is willing to take the risk that his machine will not be important to his war output role and agrees to talk of selling—his price usually is too high.

Washington Session — Machinery Dealers' National Assn. reported that the industry will meet with U. S. officials on Feb. 8 and 9 to discuss prices, allocations, and priorities on used machine tools. Speakers from the Economic Stabilization Agency, National Production Authority, and the NSRB may address the meeting.

On the Block—Equipment of the Carey Machine Tool Co., Cleveland, was sold at public auction on Jan. 16. The heavy tool and die and manufacturing plant, which had purchased the majority of its machines new in the 1942-1945 period, put on the block lathes, shapers, milling machines, grinders, drills, honing machines, air compressors, planer and boring mills, and miscellaneous items.